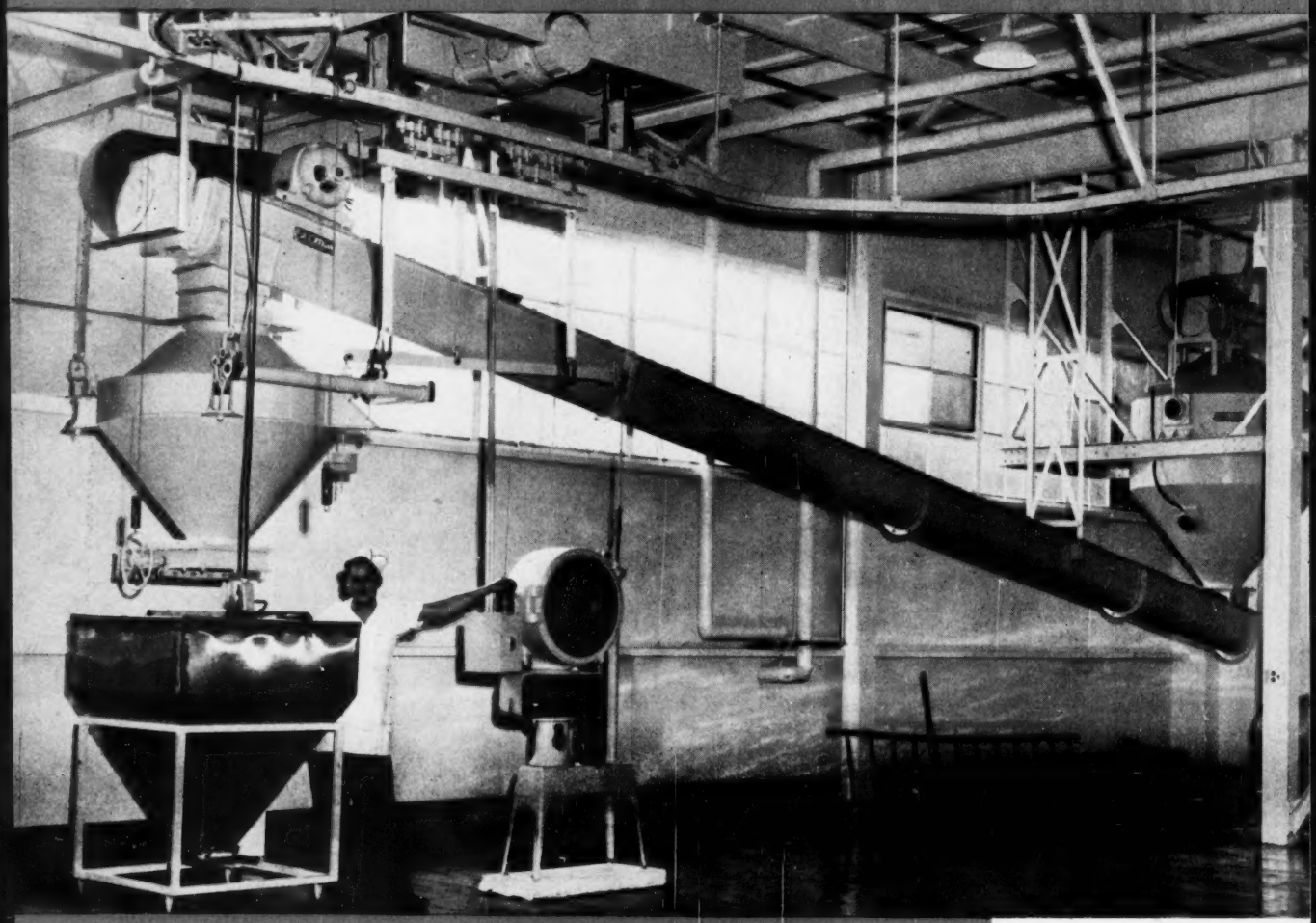
FOOD ENGINEERING

A McGRAW-HILL PUBLICATION • FORMERLY FOOD INDUSTRIES

February 1954

35 CENTS



SUGAR is conveyed to weigher, then drops into hopper that's tramrailed to Smucker's preserve cookroom. (P. 133)

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. . . for help on your job. It brings needed data on equipment, ingredients, supplies—also useful catalogs. As you read this issue, circle page numbers on

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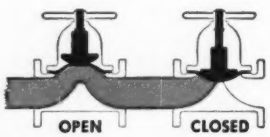
What valve would you specify?

The seven liquids cited above give dramatic emphasis to the all-around versatility required of a valve in the food field.

Grinnell has a valve that "fills the bill" . . . the Grinnell-Saunders Diaphragm Valve. Although employing only a single basic design, this unique valve provides a wide choice of body, lining and diaphragm materials.

To illustrate, for use on lines handling vinegar, stainless steel Grinnell-Saunders Valves equipped with butyl diaphragms are available. For handling beer, polished bronze valves are recommended with special white diaphragms which impart no taste or color to beer and are unaffected by caustic soda or steam cleaning.

The amazing adaptability of the Grinnell-Saunders Diaphragm Valves in handling highly corrosive fluids, gases, compressed air, beverages, foods and suspended solids . . . in lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are costly factors . . . explains its acceptance by industry after industry. For further details, write for Grinnell-Saunders Diaphragm Valve Catalog.



Features which have made Grinnell-Saunders Diaphragm Valves the specified valve in many different industries:

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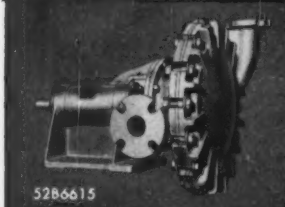
Find the Best Pump for Your Process Job Here—

	TYPE	APPLICATION	SIZE RANGE	SPECIAL FEATURES
Frame Mounted: 5286351, 5286105 Close-coupled: 5286083, 5286140	**SSB** Single suction Frame mounted Grease lubricated Also available close-coupled	General purpose use	Heads to 550 feet. Capacities to 3500 gpm. Temperatures to 250 F.	Available in many materials. Choice of packing, single or double mechanical seal. Bearings protected from corrosive or abrasive atmosphere.
5287638, 5286105 (Multi-stage)	**SSB** Single suction Frame mounted Oil lubricated	Chemical, petroleum and general purpose use in medium high temperature range	Heads to 550 feet. Capacities to 3500 gpm. Temperatures to 550 F.	Available in many materials. Choice of packing, single or double mechanical seal. Stuffing box cooled above 250 F.
5287775	**Refinery Type R** Single suction Frame mounted Oil lubricated	Volatile liquids and high temperature process applications requiring heavy duty refinery type pump	Heads to 600 feet. Capacities to 1300 gpm. Temperature to 800 F.	Available in many materials. Choice of packing, single or double seals. Stuffing box, bearings, and pedestal may be water cooled.
 5286615	**P and PD** Single suction Frame mounted Grease lubricated	Handling fine abrasives in suspension or corrosive liquids	Heads to 260 feet. Capacities to 1300 gpm. Temperatures to 250 F.	Stuffing box on suction side. Choose packing, mechanical seal or *Equiseal* stuffing box — stops leakage to 15 feet suction head. Open or closed impeller.
5287112 (PW) 5286381 (CW)	**PW — CW** Single suction Frame mounted Grease lubricated	Handling slurries and pulps which combine corrosive liquid with suspended solids	Heads to 270 feet. Capacities to 10,000 gpm. Temperatures to 250 F.	Available in many materials. Choice of packing or mechanical seal. Easy to disassemble for inspection or repair.

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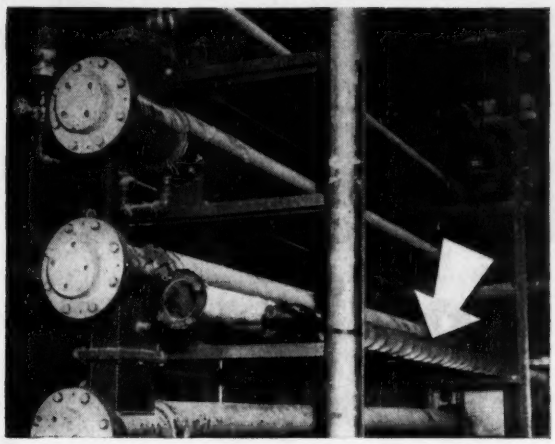
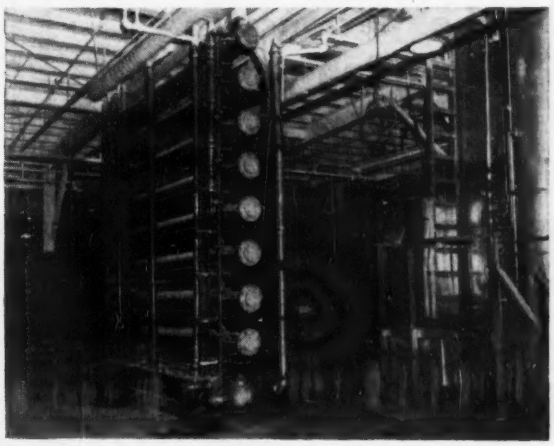
PRACTICAL IDEAS





Ends Bacteria Build-Up

Those who process squash for freezing are familiar with the problem of rapid bacteria build-up unless the time element between cooker and freezer is cut to the minimum.

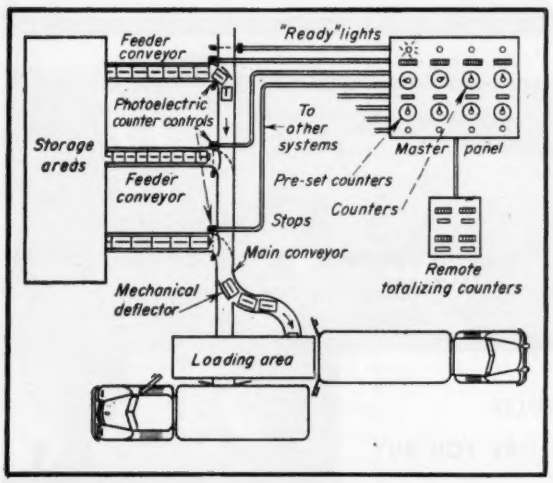
At Seabrook Farms Co. we now prevent any growth of bacteria during the interval between cooking and freezing by starting on the freezing cycle directly from the cooker. However, present procedure was accomplished only after considerable experimentation.

First attempt at rapid temperature removal was to pass hot squash through four tubes in series in which the cooked squash was both agitated and moved forward by screw conveyor flights (see left photo) within the tubes. Cooling effect was supplied by 60 deg. F. water circulated in jackets around each tube.

Next an increase in cooling effect was attempted by doubling the number of tubes employed (see right photo).

Finally, 60 deg. F. cooling water in the jackets was replaced by brine at a temperature of minus 40 F. This procedure checked bacteria growth completely. However, a satisfactory technique had to be worked out.

When starting on the cooling operation, it was found hot squash must enter each tube just before or simultaneously with the entrance of the refrigerant into the jacket of the tube. When properly manipulated they very thin film of frozen squash which forms inside the tube, conforms to the contour of the screw flight, with the result that heat of product is sufficiently distributed to prevent further freezing of the pulped squash in the tubes. However, cooling of the product from 212—70 F. is now sufficiently rapid to prevent any bacteria growth.—*Belford L. Seabrook, Chief Engineer, Seabrook Farms Co., Bridgeton, N. J.*



Automatic Conveyor Control System

In a large modern brewery handling thousands of cases of beer and ale daily, there was the constant problem of filling orders accurately and moving them swiftly from storage areas to waiting trucks and trailers. Difficulties were increased since loading docks were limited. Serious traffic congestion resulted if trucks were not loaded quickly. Also, eight different sizes and types of containers (cans, quarts, steinies, etc.) had to be conveyed and routed correctly. Complicated requirements of the operations from storage to shipping dock indicated need for reliable automatic devices which would both count and sort cases making up a single order.

Counters actuated by mechanical limit switches were not accurate enough, since variations in size of cases and their positions on conveyor as well as dents, holes and torn spots in the cartons all interfered with mechanical limit switch operation and contributed to inaccurate counting. Also, high impact of fast-moving cases made mechanical switches bounce. False counts were registered and switch failures due to wear were excessive.

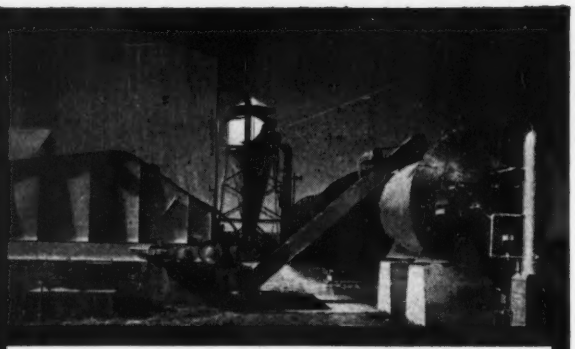
Then photoelectrically controlled predetermined counters were installed which accurately tabulate cases of all descriptions, shapes and weights.

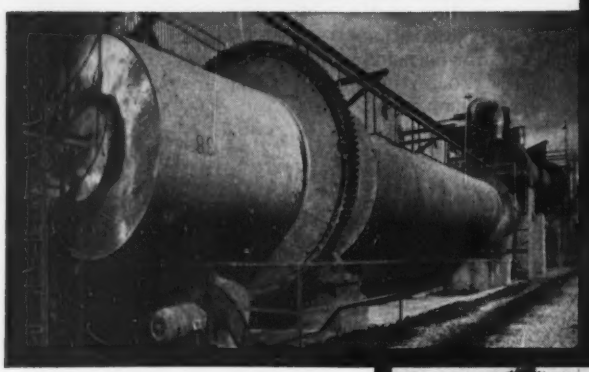
Here's how the new system works.

Main conveyors run from storage to shipping area. At storage end main conveyors (see sketch) are fed by feeder conveyors—each of which carries cases of a specific type of beer or ale. Each feeder conveyor is equipped with photoelectric control at the junction with the man conveyor.

When a case passes through the beam, the photoelectric relay operates two electromagnetic counters. One is a simple totallizing counter, and the other a predetermined counter. Counters for all lines are grouped at a master

more than 50 years of experience in designing and building dryers for industry...





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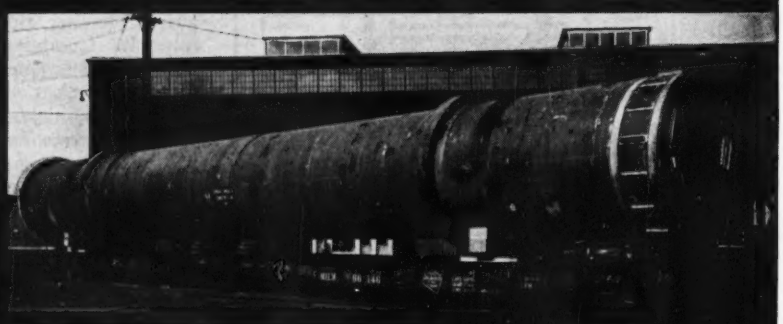

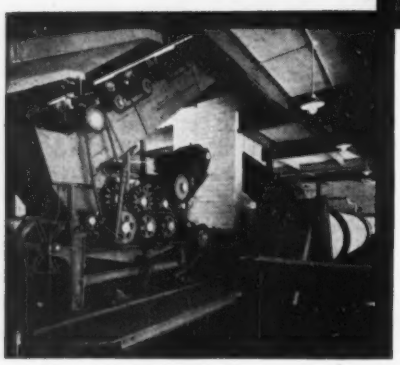

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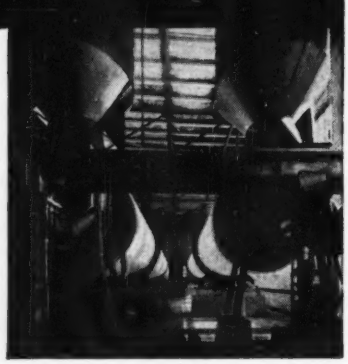
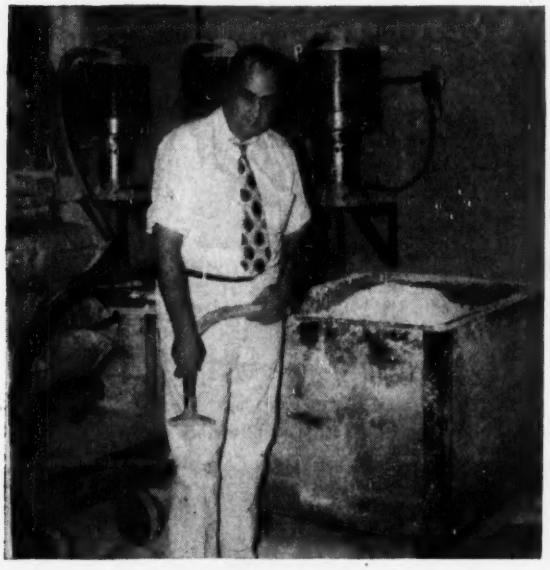


control panel, so one operator can supervise the count for any line.

Upon receiving an order, the operator sets the dial of one predetermined counter for the number of cases of a given type. By remote control, he opens a deflector to route the cases from feeder to main conveyor. He then pushes a "start" button to operate the selected feeder conveyor.

When the required number of cases pass the light beam on the feeder conveyor, the predetermining counter stops the conveyor and lights a lamp at the control panel to indicate that this part of the order has been completed. This procedure is repeated for each type of case ordered by selecting proper feeder conveyors and counters.

This efficient control system has not only increased the speed, efficiency and accuracy of filling orders, but has also resulted in considerable reduction in labor costs. Also, appreciable saving have been realized through reduction of maintenance costs and lost time due to mechanical switch failure.—*Photoswitch, Inc., Cambridge, Mass.*



Vacuum "Brushes" Remove Hazard

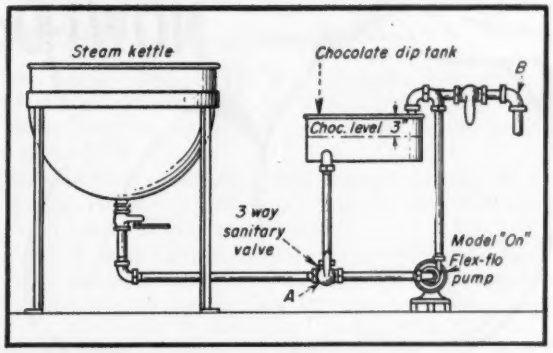
At the end of each shift and at the close of the day, workmen in dusty food plant areas like to brush off their clothes. Sometimes a compressed air hose, intended for cleaning equipment, is used by workmen to dust their uniforms. Compressed air is effective, but at the same time dangerous. Not only does it blow particles with enough force that they may lodge in someone's eye, but it can do serious physical damage if workmen get playful with the hose—and they often do.

To solve these problems, Kroger Co., Cincinnati, installed three vacuum cleaners on one wall of its candy department, starch room, near the door. Each of these vacuum units has a 6 ft. flexible hose with a 3-in. nozzle—the size handiest for going over clothing.

When not in use, the hose hangs in a bracket that holds the start-stop switch for the vacuum cleaner's motor in the "Off" position. And as soon as a workman picks up the hose to dust himself, the cleaner goes into action.

Three men can dust their uniforms simultaneously, and in a matter of seconds. So the three units will take care of several people.

Angle-iron brackets support the vacuum cleaners about 4 ft. above floor level, out of the way of caster-mounted bins and high enough for convenient use.—*FE Staff.*



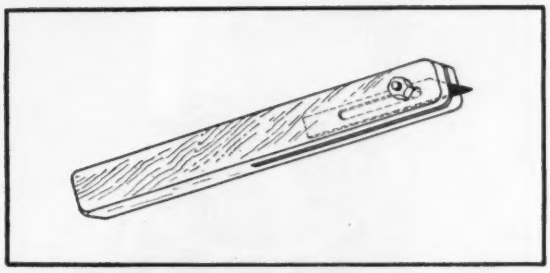
Costs Cut by Recirculating

Chocolate coating of ice cream stick confections can be measurably improved if the coating liquor is kept in constant motion by re-circulation. If this is done the yield per pound of chocolate will be increased by about four ice cream sticks. Also, surface of coating will be smoother, sludge will be prevented from forming in the bottom of the tank, and waste will be eliminated.

Proper level in the dip tank is maintained by opening a three-way valve—(A) in sketch—to allow melted coating from the steam kettle to be pumped into the tank. When the proper level has been reached, the three-way valve is reset to both recirculate and draw necessary amount of make-up from the kettle.

The 3-in. gap between the level of the chocolate and the outlet from the discharge pipe on the pump permits desired air incorporation agitating the liquor to prevent sludge from forming in the bottom of the tank. Thus any moisture or particles of ice cream from the stick novelties is kept thoroughly dispersed throughout the chocolate.

Discharge line (B) permits thorough removal of chocolate liquor from the dip tank at the end of the run.—*"Cherry-Burrell Circle," Cherry-Burrell Corp., Chicago.*

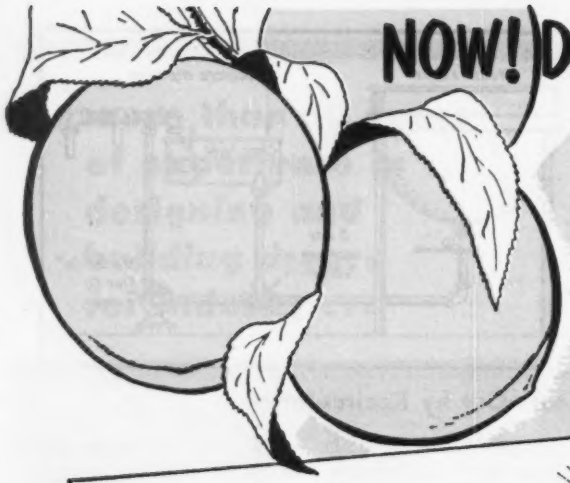


Speeds Stockinette Stripping

Before in packaging our smoked butts in Cry-O-Rap bags (which are evacuated and water-shrunk), we must remove the stockinettes from these meats while they are suspended on 5-bar carriers suspended from an overhead monorail. We formerly used a standard blade knife to strip the stockinettes from the butts.

This was slow work because the men had to be careful not to gouge the product too deeply. Marring the butts in this manner would amount to a loss, inasmuch as they would have to be re-worked into another product.

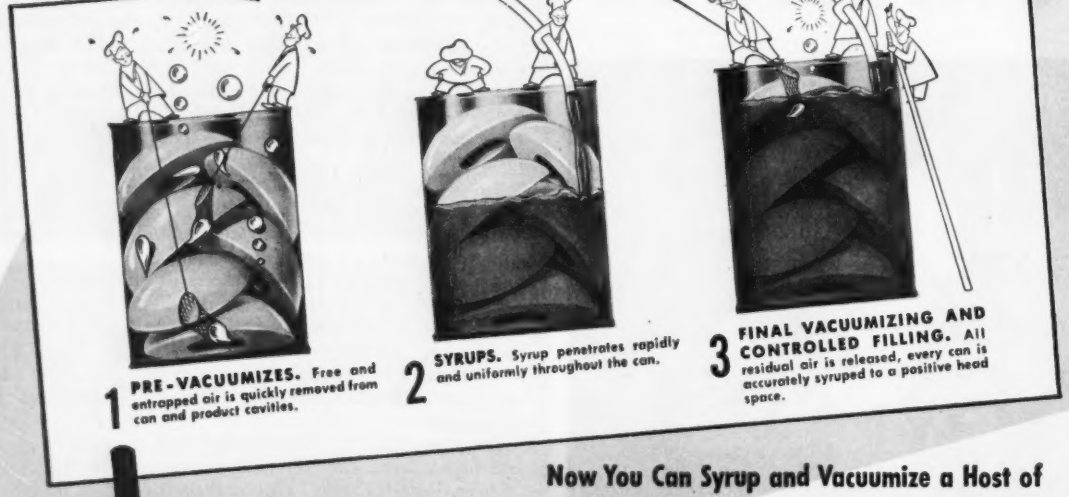
To solve this problem, we devised a simple, and yet safer, knife (see sketch). It consists of a 4½x5/8x⅛ in. piece of wood that is rounded at the ends and sawed longitudinally about half-way through. Inserted in this slit is a Linker machine cutting blade (used to cut string from linked and tied franks or sausages). This is secured to the



NOW! Do two jobs faster with one

fmc

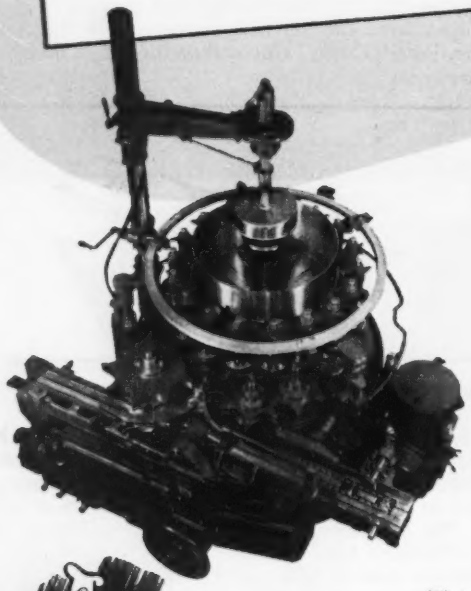
PRE-VACUUMIZING SYRUPER



1 PRE-VACUUMIZES. Free and entrapped air is quickly removed from can and product cavities.

2 SYRUPS. Syrup penetrates rapidly and uniformly throughout the can.

3 FINAL VACUUMIZING AND CONTROLLED FILLING. All residual air is released, every can is accurately syruped to a positive head space.



Now You Can Syrup and Vacuumize a Host of Canned Food Products on *One* Compact Machine— *To a Uniform Fill, at High Speed and Low Cost*

The new precision-built 18 valve FMC filler greatly steps up operating efficiency in the canning of quality fruits and vegetables. This equipment combines vacuumizing and syruping operations in one compact unit, to meet the most rigid requirements for high-speed, thorough syrup penetration and complete release of entrapped air. Filled cans are conveyed directly from syruper to the closing machine. Every can is syruped to an accurate head space level for complete uniformity. Spillage and waste are eliminated by the well-known FMC "No can—No fill" mechanism. Polished stainless and alloy contact parts resist wear, are easily accessible for cleaning and maintenance, and provide highest standards of sanitation.

The FMC No. 18 Pre-Vacuumizing Syruper smoothly handles can sizes from 211 to 404 diameter, 300 to 704 height—at speeds up to 275 cpm, depending on can size.

Plan to get *all* the facts on this equipment *today!*

Write for new bulletin, or call your nearest FMC representative.

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

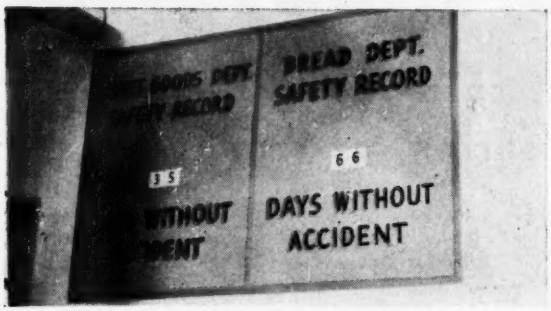
General Sales Offices:

WESTERN: SAN JOSE 6, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS

wooden handle by nut and screw, the point of the blade protruding ½ in. from the end of the wooden handle.

Now the men rapidly slit the stockinettes across the top, and from top to bottom, without marring the meat or cutting themselves.

We estimate that we've speeded our stockinette-stripping operation by almost 25%.—*George Braen, General Manager, and Richard Oldham, Plant Superintendent, Columbia Packing Co., Boston.*



Inspires Worker Competition

Many food plants post accident data in a prominent spot in each department. And this is an effective way to keep employees safety-conscious and to inspire care.

Not only is this done at the Fuchs Bakery in South Miama, Fla., but the accident figures for the two departments—sweet goods and bread—are placed side by side.

This system has the added safety benefit of causing the departments to compete to see which can go the longer without any sort of mishap whatsoever. Long industrial experience has proved that competition between crews or departments is effective in improving worker performance.

In some plants daily production figures are posted for each line, alongside figures for previous days along with the highest production ever achieved for a day's operation on each line.

In nearly every American there is a competitive spirit which urges him, as an individual or as one in a group, to try to outdo the other fellow.—*FE Staff.*

$50 Extra for Best Item

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month, you will get an additional payment of $50.

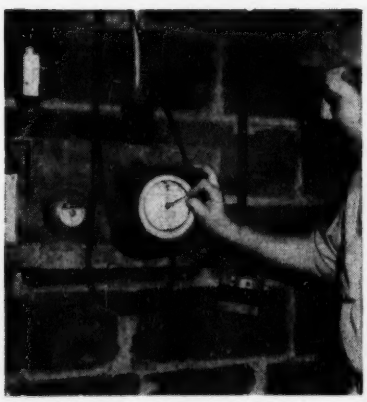
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

DECEMBER PRACTICAL IDEA winner was "Wire Belt Aids Brining in Cans", submitted by John Mattick, Plant Superintendent, P. J. Ritter Co., Bridgeton, N. J. Described was the application of a woven wire belt, suspended above and synchronized with a can conveyor, by means of which cut vegetables are safely retained in the cans without spilling while brine water is being added.



DUMPING interval is set on timer . . .

. . . WHICH rings bell for dumping

RESULT: They get uniform flow.

Timer Boosts Output, Quality

Until we installed our present system for controlling the flow of potatoes through washer and caustic peeler to the trimming table, output fluctuated. What's more, there was no "evening-up" in the consistency of bag-lots of pre-peeled potatoes. In short, bags either contained mostly small, large, or heavily trimmed potatoes. What we want is an even distribution of small, large, and heavily trimmed spuds in average bag-lots.

When flow of potatoes was too great, the spuds would pile up on the trimming table. As a result, there was considerable lost motion in seeking for small or easy-to-trim potatoes—slowing output and cutting bag-lot consistency.

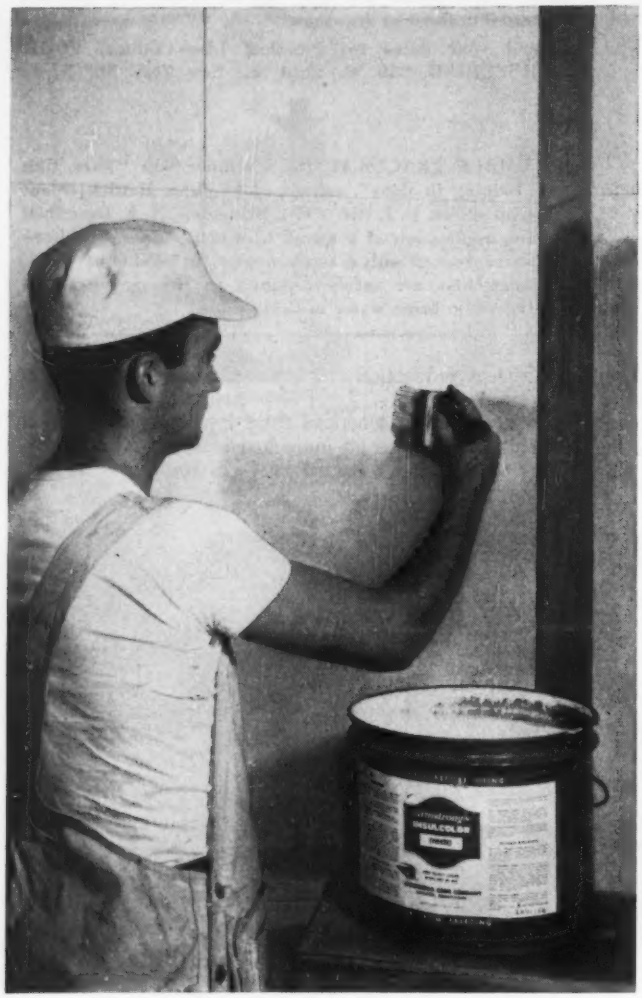
To correct this we installed an adjustable electric-clock timer hooked up to a single-stroke bell. Now we can change our production flow at will and eliminate pile-up of spuds on the trimming table. For example, the timer can be set to ring the bell at 20-sec. intervals. Ringing of the bell then signals a worker to dump a half a bag of spuds into the hopper feeding the washer.

Now production is higher and bag-lots uniform.—*Moe L. Kimmel, Vice-president, Potato Service of New York, Inc., Brooklyn.*

INTRODUCING

Armstrong's Insulcolor

A washable, plastic, cold-room finish that won't crack, shrink, or craze



Easy to Apply. Insulcolor is quickly applied to insulation with either brush or spray gun. On most materials, two coats form a strong, protective film.

INSULCOLOR IS AVAILABLE IN THESE COLORS:
white - dark and light blue - dark and light green - buff - yellow - gray

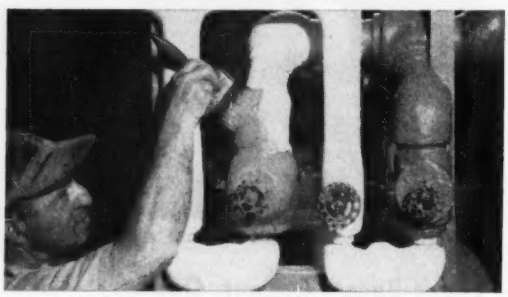
Now you can have bright, sanitary cold-room interiors that are easy to clean—that stay fresh and attractive year after year! Armstrong's Insulcolor —available in white and seven colors—is a newly developed plastic coating for use in low-temperature rooms. Completely washable, it bonds firmly to portland cement plaster, asphalt emulsion, and bare corkboard surfaces. Low temperatures have no harmful effects on Insulcolor. This finish will hold up as long as the base to which it's applied.

SAFE TO USE. There are no inflammable solvents in Insulcolor, so fire hazard is eliminated during application. Wet or dry, Insulcolor is completely fire-resistant.

EASY TO CLEAN. Dust, dirt, grease, and soot can be readily washed off Insulcolor's smooth surface. A single Insulcolor application lasts many years without recoating.

USE INDOORS OR OUTDOORS. Highly resistant to water and surface damage, Insulcolor can be used over outdoor piping and equipment, as well as in indoor applications.

FOR FREE BOOKLET—describing the use and application of Insulcolor—call your nearest Armstrong office or write to Armstrong Cork Company, 2502 Seventh Street, Lancaster, Pennsylvania.

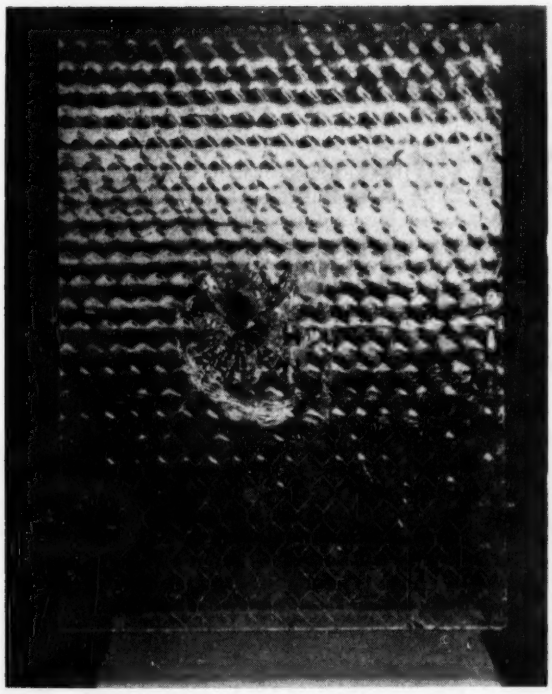


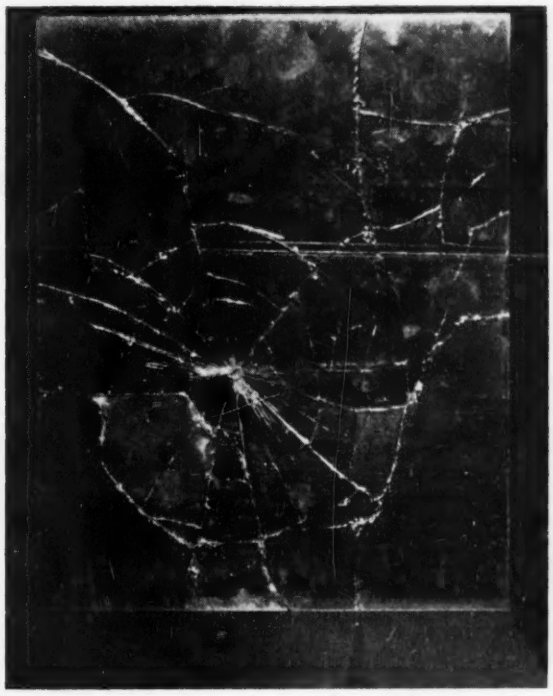
NEW INSULCOLOR PROTECTS AND IDENTIFIES INSULATED COLD AND HOT LINES, DUCTS, TANKS

Identification of brine, cold-water, steam, and other lines has usually been by stenciled words or painted colors, applied after the finish was dry. Now, with Armstrong's Insulcolor, you get color identification and insulation finish in one application.

ARMSTRONG'S INSULCOLOR

For more information, use coupon on page 159.





Low Cost Safety Glass

Food plants above all others have a vital interest in glass that does not shatter. From whatever source, broken glass may injure workers and also contaminate the product.

And of course desirable daylight in plants means windows with glass that can shatter with disastrous results, or else shatter-proof window panes must be provided.

These can be costly—from $1.30 per 14x20 in. wire glass bound pane to $5 per 14x20 in. clear glass pane, wire-bound. Alternative types of material are equally costly.

To meet this situation investigation was made by the Sanitary and Maintenance Department of General Foods Corporation to determine the best and most economical method of providing the company's plants with non-shatter glass.

Among the tests made were applications of sprayed-on plastic material used normally for rustproofing of machinery. Results showed that the plastic material was very satisfactory as a shatter retardant (wire glass seen left photo; coated right) and that it actually held the broken pieces together except when the glass was struck with a very severe blow.

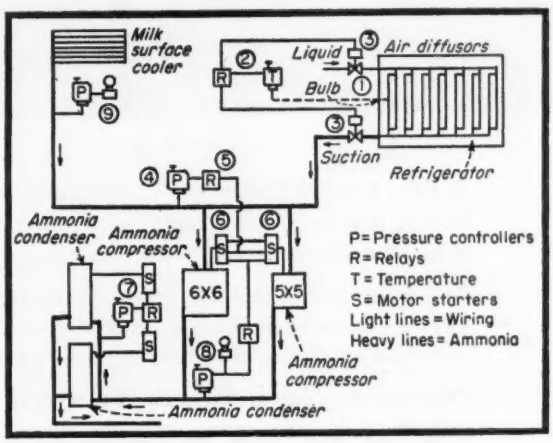
Finally chosen as the result of the tests was Liquid Envelope Permanent Clear # D2089. Tests were so gratifying that all windows in the head houses of grain tanks were sprayed and also some additional areas in strategic spots where contamination of foods might occur if windows were broken.

Cost of applying two coats of the plastic material per 14x20 in. pane was determined as only 1¢ for labor and 1½¢ for material.

For applying plastic to the inside surface of the glass a DeVilbiss # NBC-62746 spray gun was used with 30 lb. per sq. in. air pressure.

During a series of tests, panes of coated glass were broken at regular intervals and under controlled conditions to obtain a comparison with wire glass broken under identical conditions. After five months of testing results indicate that there is no apparent deterioration or loss of effectiveness of the Liquid Envelope coating.

When glass with the plastic coating (made by Better Finishes and Coating Co., Newark, N. J.) was broken with a raw-hide hammer there was considerably less powdered glass and fine slivers than when the same test was performed on wire glass.—*Franklin E. Crooks, Post Cereals Div., General Foods Corp., Battle Creek, Mich.*



Controls Minimize Ammonia Danger

By installing a system of non-indicating controllers that eliminate guesswork, Fraim's Dairies, Wilmington, Delaware, have minimized the danger of ammonia in their refrigeration system.

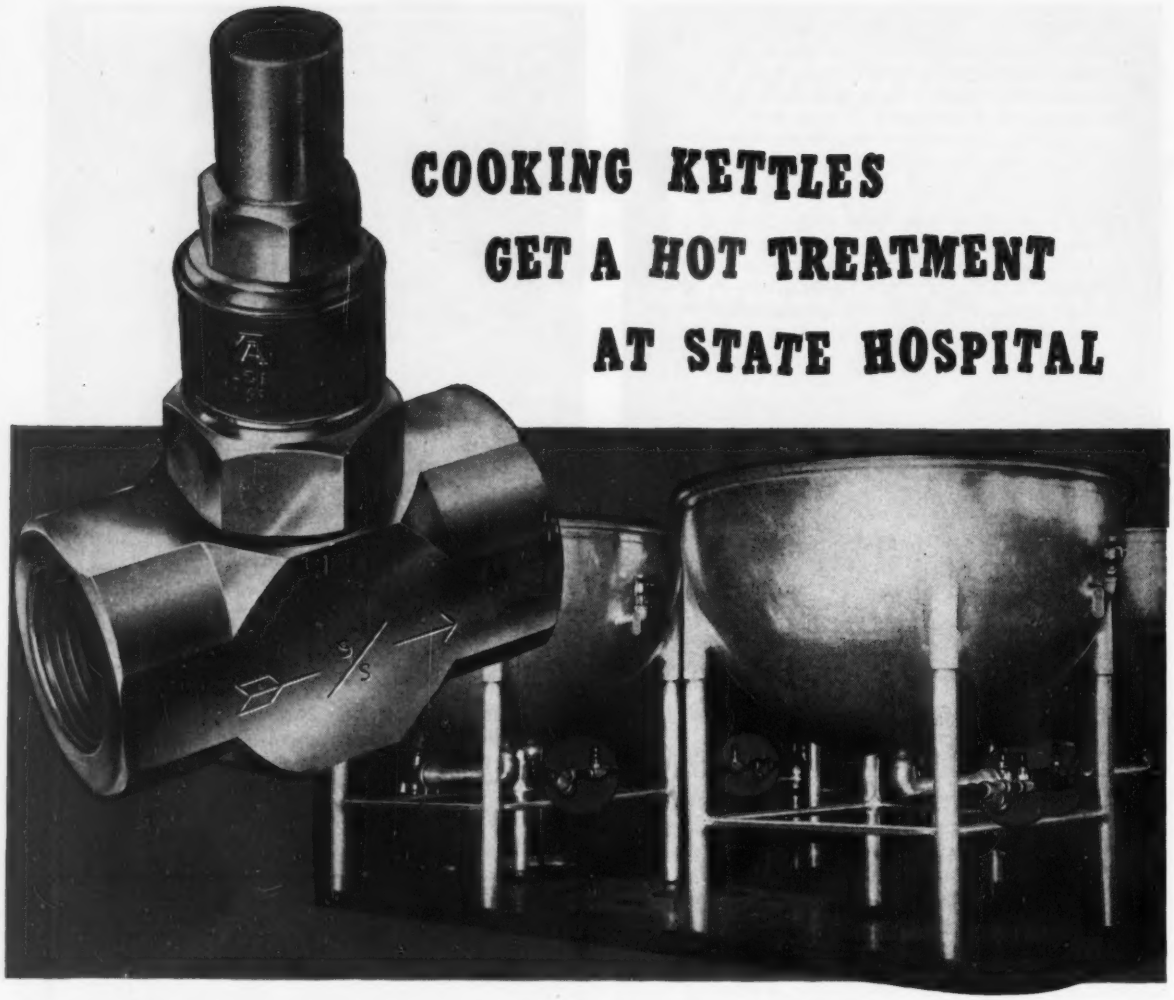
Here is the system and how it works.

Temperature controller—(1) in sketch—located in the refrigerator senses a rise in temperature. Controller then closes its contacts and energizes its relay (2).

In turn, this relay energizes both solenoid valves (3) in the ammonia liquid line and in the ammonia suction line, thus permitting ammonia to enter and leave the air diffusers in the refrigerator.

Ammonia gas being discharged from the refrigerator line causes an increase in pressure at pressure controller

COOKING KETTLES GET A HOT TREATMENT AT STATE HOSPITAL



Yarway Impulse Steam Traps have put new life in many a "sick", sluggish cooking kettle. In fact, they are "good medicine" for the profitable operation of steam equipment of all kinds because they get equipment hot in a hurry and keep it hot!

At the installation pictured above, in the kitchen of North Carolina State Hospital, Yarways have been doing a good job for over 10 years. Besides quick heating and sustained efficiency, the plant engineer reports "little if any service required."

Other Yarway features are small size, easy installation, light weight, stainless steel construction, only one moving part, good for all pressures.

When you consider that new Yarway Impulse Traps often cost no more than repairing ordinary steam traps, it makes them a doubly good investment.

See the nearest of more than 200 Industrial Distributors who stock and sell Yarways. For free 20-page Trap Selector write . . .

YARNALL-WARING CO. • 127 Mermaid Avenue, Philadelphia 18, Pa.

YARWAY

the steam trap designed with more production in mind

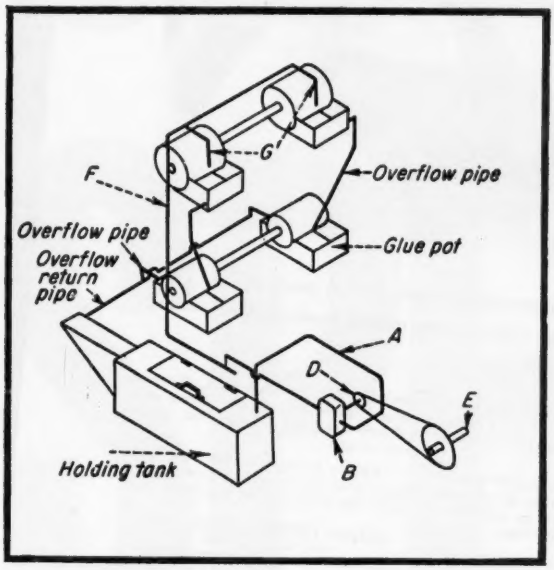
For more information, use coupon on page 159.

(4), closing contacts which energize the relay (5) and in turn the ammonia compressor's motor starters (6).

The pressure is then raised on the discharge side of the compressors as they are started, causing the pressure controller (7) to close and energize the relay to start the condensers.

If the condensers do not operate, however, pressures might increase to a point of danger. Therefore, normally closed pressure controller (8) opens its contacts causing an alarm to ring and the circuit to the motor starters of the compressors to be broken.

Should the compressors stop on safety or in the event of power failure at a time when milk is being cooled, pressure in controller (9) would increase to an alarming point. Controller, however, senses the increased pressure and rings an alarm to summon an operator to shut off all cooling operations.—*"Industrial Control News," Minneapolis-Honeywell Regulator Co., Philadelphia.*



Sealer Glue Handling Improved

A better method of handling glue than the usual spout cans or by piping it from the floor above, a fully automatic service of storing and feeding liquid glue to the glue rolls of a case sealer and maintaining a constant level of the adhesive, has recently been put in operation on all case sealers at Franklin Baker Division of General Foods.

Although other adaptations of this principle have been tried at various times, company is convinced after extended usage, that this new development has best solved the problem. Here is how it was done:

A holding tank was fabricated to meet capacity requirements. One shown is 36x14x11 in. Sufficient glue is held in this size tank for 3 to 5 days of operation, depending upon case production.

Tank is totally enclosed and has a hinged door in the top 12x6 in. wide through which glue may be added to the tank. A ½ in. input pipe—(A) in sketch—is connected from the supply tank to a circulating pump. The gear-type pump (B) is driven by a shaft mounting the 9-tooth sprocket (C). A 40-tooth split sprocket (D) is mounted on a shaft (E) of the case sealing machine to supply power for the system. The two sprockets are connected by a length of #40 roller chain.

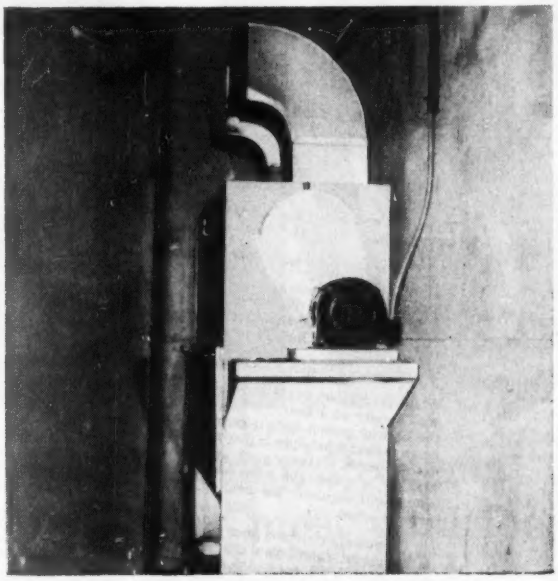
A ½ in. output pipe (F) connects the circulating pump to the 1¼x9 in. feed lines (G), so that a continuous flow of adhesive is provided while the case sealer is operated.

The two upper glue pots are drilled on the sides to accommodate overflow pipes. The drill holes are centered 2½ in. from the top of the glue pot and ½ in. pipe fittings are braised in place at each drill hole. Overflow pipes, ½x14 in. are connected to the braised fittings and extend to the two lower glue pots.

To accommodate overflow pipes, two lower glue pots are ½ in. drilled in front of the glue rolls. These drill holes are centered 1 in. from the top of the pot and ½ in. pipe fittings, 1 in. long, are braised in position at the drilled holes. A length of 2 in. pipe is connected from the two lower overflow pipes to the top of the supply tank, shown in diagramatic sketch. This completes mechanical installation.

In operation the pump circulates the adhesive from the supply tank to the upper glue pots where it gravitates down through the overflow pipes to the lower glue pots. The lower glue pots overflow surplus adhesive into the 2 in. return line where it flows by gravity to the supply tank. No valves are required and no adjustments are necessary on this equipment.

This system assures more uniform adhesion and improved cleanliness, and the only attention necessary is that of refilling the glue tank as required.—*E. T. Enright, General Foods Corp., New York City.*



Two Bull's-Eyes With Refrigeration

Controlled lower temperature—Morton Foods Co., Dallas, has proved—can materially aid users of vegetable oils such as those from cotton seed and corn, used in the preparation of such products as salad dressing, potato chips, etc.

If the oil as received is immediately lowered to 60-65 deg. F. and is then maintained in the plant at that temperature, development of rancidity will be retarded. This cooling operation at Morton's is accomplished by directing a blast of cold air from a unit cooler against the oil-storage tank (see photo).

Also when down to 40 deg. F. just before processing, oil is at the best temperature for emulsifying into mayonnaise and salad dressing—*Lt. Robert Latimore, Falsmouth, Mass.*

What makes people fat?

People get fat simply because they overeat

Why do they overeat?

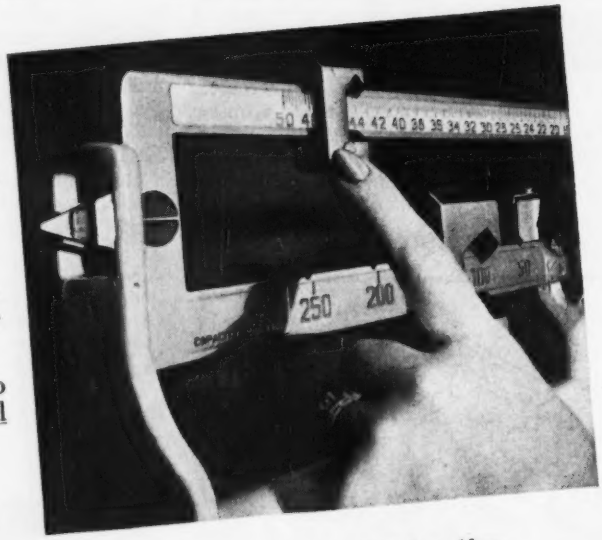
Because they're hungry

Why are they hungry?

One of the reasons in healthy individuals is because their blood sugar level is low

What is the fastest way to raise the blood sugar level and help keep from overeating?

Sugar and the good things containing it!



Nutritional research has taken a new look at our number one health problem and discovered how sugar helps keep your appetite and weight under control

There is a new nutritional term that you will soon be hearing a lot more about.

It is your "*blood sugar level.*"

Research scientists at one of our leading universities have discovered that your blood sugar level plays an important role in determining how hungry you are.

Nature's "Hunger Thermostat"

When your blood sugar level is *low* you are "hungry as a bear." When it is *high* the healthy person finds it easier to turn down the extra helpings of food that mean extra pounds. It turns your appetite on and off in much the same way that a thermostat regulates the heating system in your house.

If you are watching your weight, this is important news—you can raise your blood sugar level, *tame your runaway appetite* any time you want to. Just eat or drink something with sugar in it.

Sugar is assimilated into the blood stream and used as energy faster than any other food. It satisfies your craving for food faster than any other thing you can eat, because it *almost immediately* raises your blood sugar level.

That is why an 18-calorie spoonful of sugar in your coffee or tea may make it easier for you to cut 100 or more calories from your diet.

That is why, when you round off a small meal with a simple dessert you get as great a feeling of satisfaction as you would from a much larger meal providing far more calories.

That is why something with sugar between meals not only revives your energy, but helps you to keep your *appetite within bounds* at the next meal!

Sugar Substitutes Not Effective

Naturally you cannot expect the same help from chemical sweeteners which have no effect on your blood sugar level. Since they do nothing to curb your appetite, you may find that, by using them, you are eating *more calories* than they save you.

The best way to get the protein, vitamins, minerals and *energy* we need is in a well-balanced selection of foods that nature made us like.

Nature is sugar's best salesman. Sugar must be one of our most needed foods—*that's why we like it so much.*

SUGAR INFORMATION, INC.
New York 5, New York

18 CALORIES

Surprise you that there are only 18 calories in a standard level teaspoon of sugar? Folks we asked guessed anywhere from 50 to 600. You'd have to eat 140 to 200 spoonfuls of sugar to get your day's needs of calories!

All facts in this message apply to both beet and cane sugar.

Here's the first ad—one that answers a question that's on everybody's mind, with the latest facts from research at a leading university. It appears as a full page ad in Life, January 18; The Saturday Evening Post, January 23; Look, February 23; New Yorker, February 20; Ladies' Home Journal for March, and in newspapers from coast to coast on January 14 and 15.

SUGAR SPEAKS

Entire Industry supports Advertising Program reporting new facts about one of our most vital foods

5 Leading Magazines, 39 Big-City Newspapers to Carry Sugar's New Story

The great hassle over calories has stirred up so much public confusion that it is time to clear the air.

So the men who are responsible for supplying the food industry with 8,000,000 tons of sugar a year are going to tell people the facts about the nutritional importance of sugar—not only in normal diets, but in reducing diets as well.

The program gets under way this month with one of the most newsworthy ads ever published in the interests of any food. It's reproduced on the facing page. Read it and we think you'll agree that it—and others like it—will go a long way toward shaping sound, favorable attitudes about diet that will help keep this the best-nourished nation on earth.

SUGAR INFORMATION, INC.
New York 5, New York

For more information, use coupon on page 159.

Choice of 7 Case Designs

WHEN YOU SPECIFY

ASHCROFT DURAGAUGES

SPECIFIC NEEDS are your best guide in selecting a pressure gauge casing. Ashcroft Duragauge Casings, made in three distinctly different types of material and seven different designs, meet practically every installation and service requirement:

ALUMALIFE®—a special aluminum alloy that is light, strong and has excellent overall resistance to corrosion and vibration.

CAST IRON — tough and durable. Used in corrosive conditions where aluminum would not be suitable.

PHENOL — light, strong, rigid plastic that is acid-proof and corrosion-proof.

Every Duragauge case is dust and moisture-proof, and the entire gauge system can be easily removed from the case *as a unit.*

To insure peak performance and maximum service life in specific installations, you can choose an Ashcroft Duragauge with the Bourdon Tube made of any one of eight different types of materials. All provide unusually long tip travel, consequently greater accuracy of indication is assured. The patented Nylon Movement outwears all others. And the micrometer adjustment pointer is easy to get at and reset precisely while on the shaft.

Remember, only Ashcroft Duragauges give you all these advantages. So — ask the nearby Ashcroft Distributor to help you choose Duragauges that fit your needs exactly.

ASHCROFT DURAGAUGE CASE MATERIALS, MOUNTING AND DIAL SIZES

CASE	BACK FLANGE	MOUNTING		CONNECTION		DIAL SIZE
		WALL	FLUSH	LOWER	BACK	
Black Alumalife® with flat, threaded Alumalife ring	Yes	Yes	Yes	Yes	Yes	4½", 6"
Black Cast Iron with flat, threaded ring of Alumalife on 4½" and 6" and Bronze on 8½", 10" and 12"	Yes	Yes	Yes	Yes	Yes	4½", 6" 8½", 10", 12"
Black Phenol Turret with snap ring	No	Yes	Yes	Yes	Yes	4½", 6", 8½"
Black Phenol with threaded phenol ring. Safety blowout disc is standard	Yes	Yes	No	Yes	Yes	4½", 6", 8½"
Black Alumalife with special ring held tightly at top by a hinge pin and at bottom by a clamp screw	No	No	Yes	No	Yes	4½", 6", 8½"
Black Cast Iron with special ring held tightly at top by a hinge pin and at bottom by a clamp screw	No	No	Yes	No	Yes	4½", 6", 8½" 10", 12"
Black Alumalife with black clamp slip ring	Yes	Yes	No	Yes	No	4½", 6"

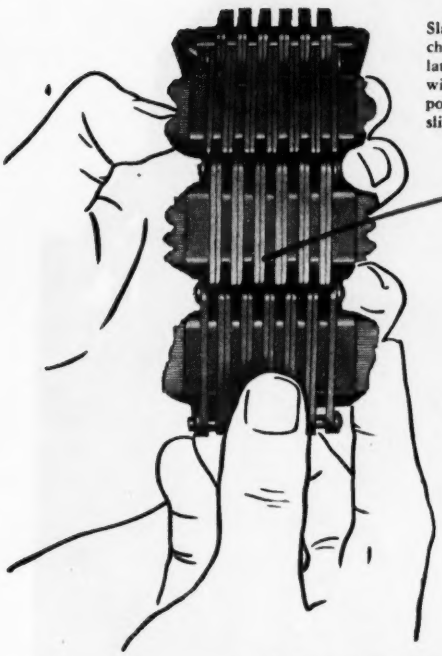
YOUR INDUSTRIAL SUPPLY DISTRIBUTOR is as close as your telephone. Long experience in serving industry makes him fully qualified to meet your needs exactly and economically.

ASHCROFT GAUGES

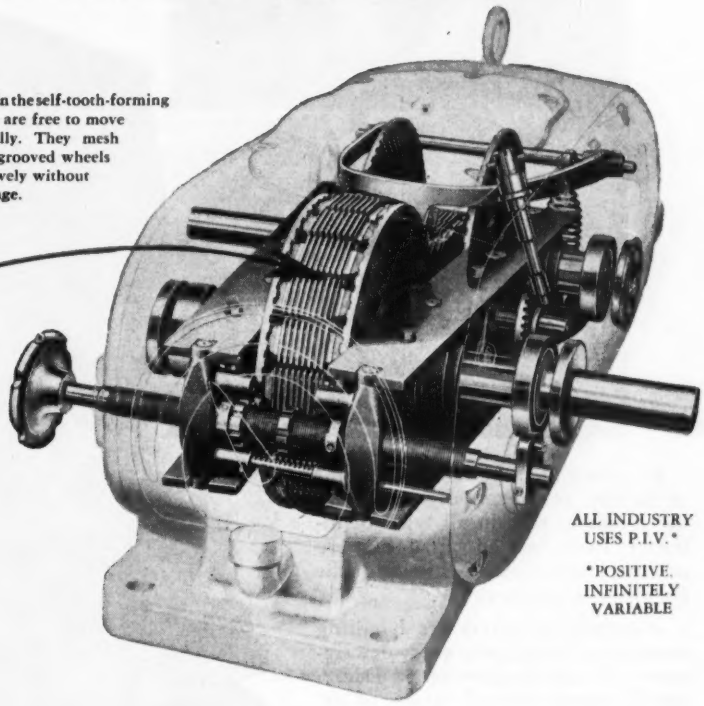
A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT

MAKERS OF 'ASHCROFT' GAUGES, 'HANCOCK' VALVES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL INSTRUMENTS, AIRCRAFT PRODUCTS. BUILDERS OF "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

Completely POSITIVE...
Completely STEPLESS
with an infinite number of speed changes



Slats in the self-tooth-forming chain are free to move laterally. They mesh with grooved wheels positively without slippage.

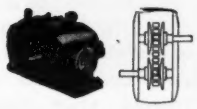


ALL INDUSTRY USES P.I.V.*

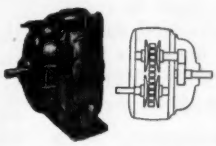
*POSITIVE. INFINITELY VARIABLE

P.I.V. Variable Speed Drive gives you exact selection from maximum to minimum speed

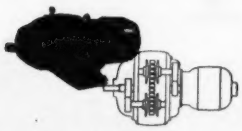
4 of 16 P.I.V types, ½ to 25 hp.—ratios to 6:1
Horizontal or Vertical Mountings



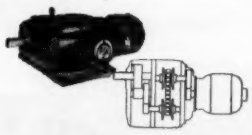
Basic Positive, Infinitely Variable Speed Drive. Compact.



P.I.V. with single reduction input or output helical gears.



Motorized P.I.V. with single reduction input and output helical gears.



Motorized P.I.V. with single reduction input and double reduction output helical gears.

ONLY Link-Belt's P.I.V. Variable Speed Drive uses self-tooth-forming chain to provide positive, stepless speed changing. The chain meshes with grooved wheels, transmits power without wasteful slip.

What's more, Link-Belt's P.I.V. changes speeds accurately under full load, delivers full-rated horsepower to your machines. That's because P.I.V. is not dependent on friction for power transmission. Its all-metal construction is not affected by atmospheric conditions.

Adjustment is easy. You can obtain an infinite number of speeds with manual, electric, pneumatic or hydraulic controls . . . hold the exact speed you need at any setting.

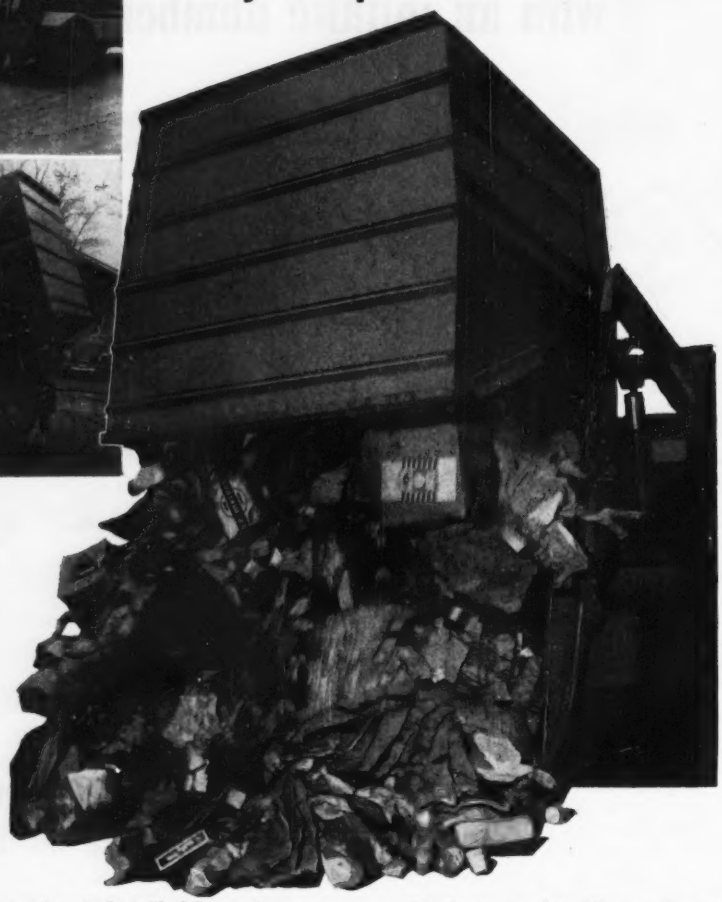
There may be a process in your plant that requires exact, variable speed transmission. If so, it will pay you to contact your nearest Link-Belt office. They'll show you how P.I.V. can increase the flexibility and efficiency of your machines. Send for Catalog No. 2274.

LINK-BELT P.I.V. VARIABLE SPEED DRIVE

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13,110

For more information, use coupon on page 159.

Rubbish Disposal is only ONE of the Cost Cutting jobs for the Dempster-Dumpster in your plant...



It's amazing, almost to the point of fantasy, yet so soundly real, what the minds of men in all types of industry have cooked up for more efficiency and reduced costs with the Dempster-Dumpster.

Hundreds of plants are handling materials of practically every description with one truck-mounted Dempster-Dumpster serving scores of detachable containers. Here are just a few. Oils, gases, and liquids handled in our Tank Type Containers . . . tools and equipment in our Tool Shed Type Container . . . containers on casters placed for receiving steel chips from lathes or at conveyors for receiving finished products . . . container with doors and windows, replacing shacks for plant guards or nightwatchmen . . . containers built to handle chlorinator ash residue of approximately 1500° F. and there are dozens more.

Containers are placed wherever material accumulates. When loaded each is picked-up, hauled and emptied (as illustrated above) . . . or load set down intact. The entire operation is handled by only one man, the driver, by hydraulic controls in cab.

The containers are built in capacities up to 12 cu. yds. and each is designed to suit the materials to be handled—be they bulky, light or heavy . . . solids, liquids or dust.

One Dempster-Dumpster, with driver, does the work of 3 to 5 conventional trucks . . . eliminates trucks and crews standing idle . . . eliminates rehandling of materials and increases efficiency and good plantkeeping.

If you have even any remote idea that this equipment could be adapted to your operation, by all means contact us because being without the Dempster-Dumpster System could easily be costing your company thousands of dollars annually. Manufactured and sold exclusively by Dempster Brothers, Inc.

One Dempster-Dumpster Handles All Containers . . . . All Sizes . . . . All Designs

DEMPSTER BROTHERS, 724 Shea Bldg., Knoxville 17, Tennessee

FIBREBOARD *Shipping Cases*

ARE ALSO TRAVELING BILLBOARDS!

In transit... in dealer displays... re-used at check-out counters as convenient carriers for customers' purchases, your shipping case is a four-sided billboard if properly used. FIBREBOARD'S Designing Department has assisted many packers and manufacturers in the effective use of this valuable advertising space.

16 plants on the pacific coast

it's the way your goods ARRIVE that counts!

FIBREBOARD PRODUCTS INC.
Head Office: San Francisco 11, California

FIBREBOARD PRODUCTS (EASTERN DIVISION) INC.
Philadelphia and Baltimore

SALES OFFICES: *(West)* Boise • Denver • Fresno • Los Angeles • Oakland • Phoenix • Portland • Sacramento • Salem • Salt Lake City • San Diego San Francisco • San Jose • Seattle • Stockton • Yakima; *(East)* Baltimore • Easton • Lancaster • New York • Philadelphia • Reading

For more information, use coupon on page 159.

Announcing An Expanded Manufacturing

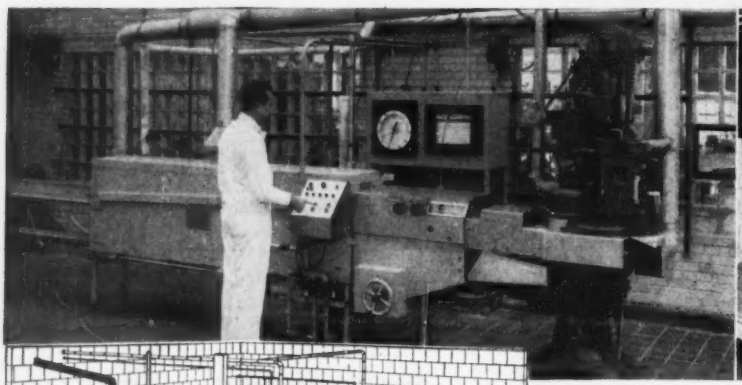
★ THE W. F. & John Barnes Company have designed and built specialized mechanical, electrical, and hydraulic equipment and machines since 1872. A highly successful Coordinated Designing, Engineering, and Equipment Manufacturing Service has been developed during these years that has helped many industries solve thousands of difficult production problems.

Now, Barnes announces an expanded program for the Food Processing Industry . . . a service that has been gradually developed during the past eight years. The five examples shown here are typical of the broad range of standard and special equipment that is today helping a number of processing plants to reduce work handling and cut costs.

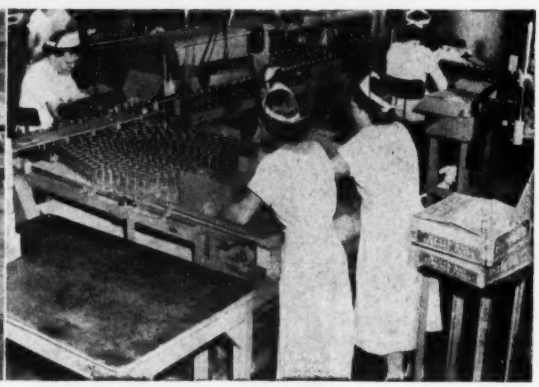
Since modernization and mechanization of manufacturing processes has been a Barnes specialty, you'll find competent engineering counsel and complete, dependable facilities available to help you solve complex problems quickly.

ASK FOR FREE ANALYSIS OF YOUR PROCESSING METHODS

Prepare now for even more competitive days ahead. Call in a Barnes Processing Equipment Engineer. He'll work with you in developing better cost-cutting methods and equipment.



MARTIN ASEPTIC CANNING SYSTEM—A short-time, high-temperature canning method that permits speedy, continuous processing . . . guarantees higher quality, better flavor, color, and texture of the product.



EMPTY GLASS SINGLE FILERS—Handle up to 600 jars per minute with practically no breakage. Design permits handling different sizes of jars. Semi-standard units available for odd-shaped jars or bottles; other units handle tin and glass interchangeably.

W. F. & JOHN BARNES

W. F. & JOHN BARNES COMPANY

PROCESS EQUIPMENT DIVISION

303 SOUTH WATER STREET • ROCKFORD, ILLINOIS

Engineering and Equipment

Service for Food Process Plants

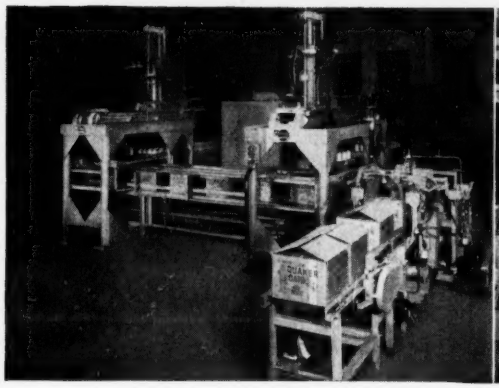
BARNES COORDINATED SPECIAL MACHINERY DESIGNING AND MANUFACTURING SERVICE INCLUDES:

1 PRELIMINARY ANALYSIS—Highly trained, skilled technicians work with you in analyzing your present facilities . . . recommend replacement or modernization where necessary.

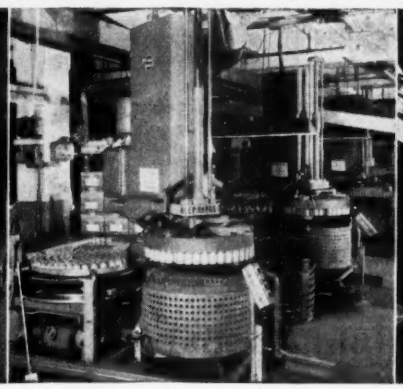
2 PROPOSALS AND COST ESTIMATES—Where new equipment is recommended, complete and detailed reports and a cost analysis are submitted for consideration.

3 DESIGNING AND ENGINEERING—Experienced Mechanical, Hydraulic, and Electrical Engineers work together at Barnes. Teamwork helps solve complex problems quickly and efficiently.

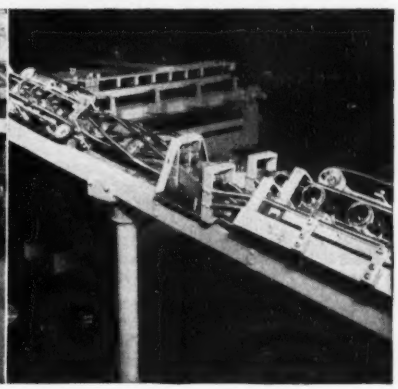
4 SPECIALIZED MANUFACTURING FACILITIES—A 75-year background and a large, well-equipped, efficiently tooled plant assure highest quality, dependable, cost-cutting machines and equipment.



CARTON UNCASERS AND RECASERS—High-speed, electro-magnetic equipment designed and built by Barnes to uncase, unscramble, count, pattern-form, and recase automatically. Unit above performs both operations. Individual units available to uncase or recase.



RETORT BASKET LOADERS AND UNLOADERS—Automatic hydraulic units for handling glass, round or square cans at speeds in excess of 600 per minute. Smooth, continuous automatic flow virtually eliminates glass breakage and dented cans.



SPECIAL CONVEYORS AND ELEVATORS—A wide variety of conveyors, teloscopic elevators, can elevators, inspection line conveyors, etc., designed and built by Barnes, speed processing and reduce work handling in food and beverage plants.

GET THESE *Facts*

There are reams of factual, down-to-earth information waiting for you . . . case histories — facts — figures for you to compare. Tear out and mail this convenient coupon NOW!

We are interested in additional information. Please send us free literature on the following, and additional data on your Engineering and Equipment Manufacturing Service:

☐ Martin Aseptic Canning System
☐ Empty Glass Single Filers
☐ Retort Basket Loaders and Unloaders
☐ Carton Uncasers and Recasers
☐ Special Conveyors and Elevators.
☐ We would like to have a Barnes Processing Engineer call at our plant.

NAME _____ POSITION _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

EQUIPMENT SINCE 1872

For more information, use coupon on page 159.

They're helping deliver a can of peaches

The can of peaches in a supermarket pushcart may well have started its travels in an ore truck like this one you see in Malaya's largest open-pit tin mine. For over a third of the world's tin is mined and smelted in Malaya.

Known as Straits Tin, this metal is 99.87% pure and world famous for its absolute reliability of grade. And this uniform quality is all-important in producing the tin plate cans are made of.

No other kind of container combines all the advantages of the tin can. The tin can is economical, strong, light and compact. It protects its contents from light. It can be easily handled in mass without breakage. And it is more convenient for the consumer both to store and to use.

With an ample supply of Straits Tin available for the future at a fair and reasonable price, does it make sense to seek substitutes for tin cans that will not be better, may not be as good, and will probably cost more?

As more and more different food products are packed in cans, plentiful, economical Straits Tin will be a more useful material than ever for the entire food processing industry!

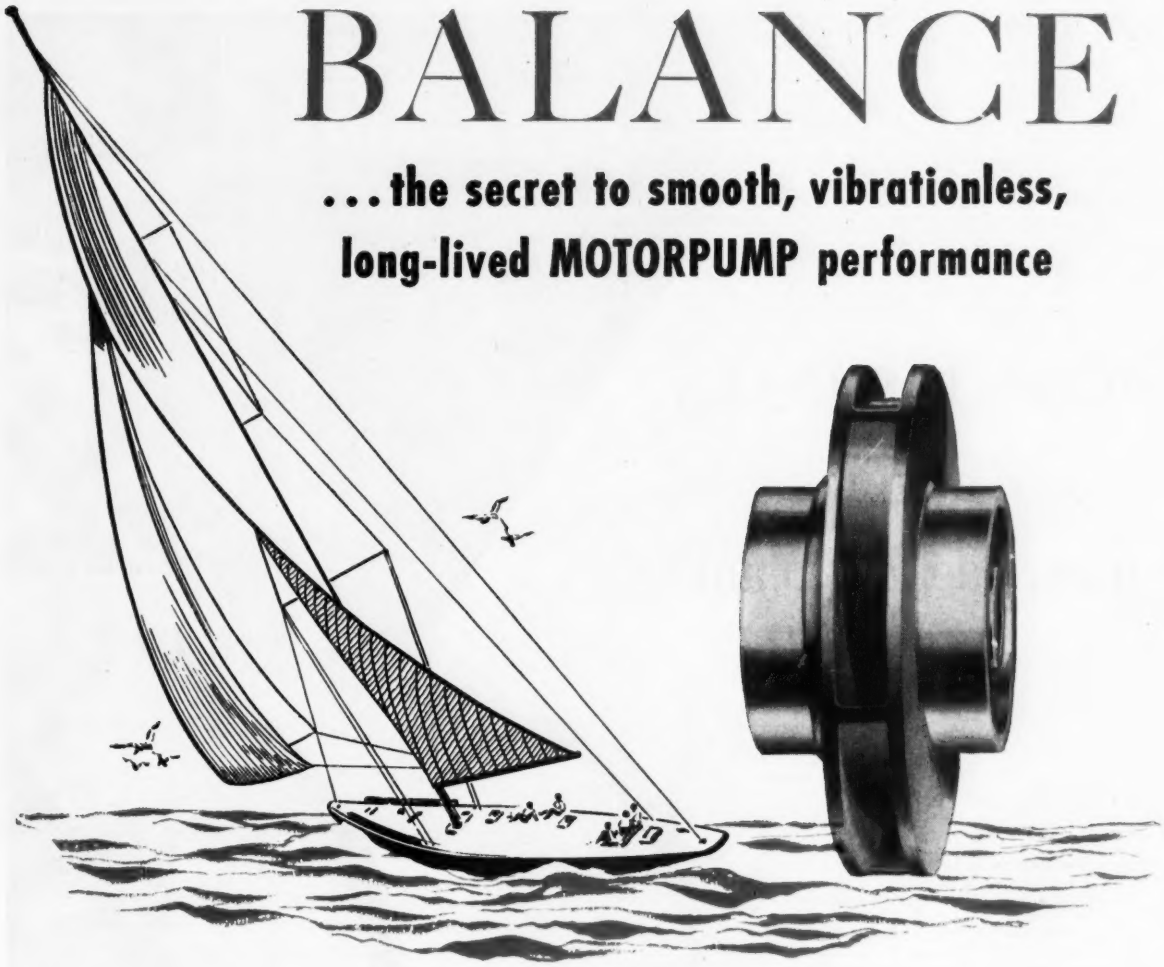
A free copy of our new bulletin, "How Straits Tin Can Help You", is yours for the asking.

MALAYAN TIN BUREAU

THE MALAYAN TIN BUREAU Dept. 266, 1028 Connecticut Ave., Washington 6, D.C.

BALANCE

...the secret to smooth, vibrationless, long-lived MOTORPUMP performance



MECHANICAL BALANCE

Is achieved by an even distribution of metal in the impeller, which keeps the radial load on the bearings and shaft at a minimum. The impeller of I-R Motorpumps is subject to critical balance tests to insure smoothness, quietness, freedom of vibration. These tests are your assurance of efficient pump performance, long trouble-free operation, a minimum of wear on close running parts.

HYDRAULIC BALANCE

In the Motorpump contributes materially to long-life and low maintenance. The engineered use of a balancing orifice stabilizes the forces acting axially on the impeller. Hydraulic balance, thus achieved, lowers the thrust load on the bearings and increases the life of the pump. It also keeps stuffing-box pressure low, which lengthens packing or seal life and reduces maintenance.

BALANCE is a law of nature which creates orderliness amid strong opposing forces. Without it there can only be swift moving forces that lead to destruction. That's why *balance* is always uppermost in the minds of I-R designers and engineers.

Balance . . . careful design . . . these hold the secret to volume flow through *small* units. This explains why Ingersoll-Rand Motorpumps are so efficient . . . why I-R Motorpumps so often outperform other pumps of the same size.

Ingersoll-Rand Motorpumps are available FOR IMMEDIATE SHIPMENT in sizes from 1/4 to 50 hp. Call our nearest branch office or write direct.

Ingersoll-Rand

975-9 **11 Broadway, New York 4, N. Y.**

For more information, use coupon on page 159.

What's U.S. Rubber doing in a meat packing plant?

Taking stripped beef fat from the hopper above is a routine job for this U. S. Meat Packers Conveyor Belt. For 1½ years it has carried this edible fat from washer to grinder without sign of deterioration.

Section of 400-foot U.S. Meat Packers Belt, shown on way to discharge point, is especially designed to withstand destructive action of fats and 180-degree hot water baths. It's extremely sanitary, odorless, non-toxic, washes easily and imparts no flavor to product conveyed.

Doing the job better than before is the axiom of U.S. Rubber belting engineers. Here they studied every operating condition before developing the belt illustrated. It replaced a metal belt which required considerable upkeep and was dangerous to the workers. These same engineers can do a similar job for you, whatever the installation. Next time you need conveyor belts, contact them at the address below.

PRODUCT OF U.S. RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Here's why

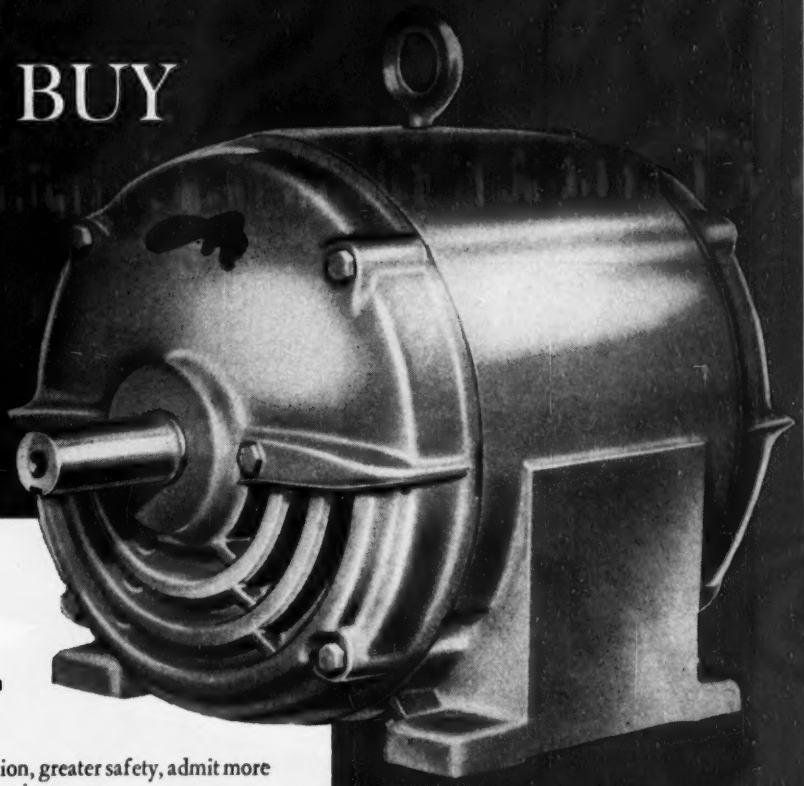
the NEW L.A. *Line*

by the Louis Allis Co.

is your BEST *electric motor* BUY

A smaller, better power package to meet new NEMA standards

with NEW MODERN STYLING



plus

Improved ventilation
New conduit-box arrangement
New bearing construction
More compact design and better protection
More versatile mounting

Here you have complete use of modern motor materials, design techniques and new manufacturing methods. You also get more power in a smaller package — and clean, streamlined motor styling to add modern appearance to the equipment these new motors drive.

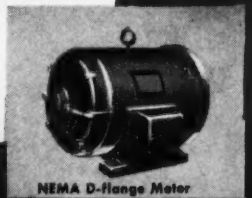
This new styling is completely functional. Ventilating grilles, for example, blend into the general motor design — yet they provide better protection, greater safety, admit more cooling air.

Completely enclosed housing provides protection for the new L.A. line in any mounting position — floor, sidewall, or ceiling.

Standardize now on the new L.A. line for both your product and your plant — and get the most modern motor construction available. See your nearby Louis Allis Sales Engineer today for the complete story.

THE LOUIS ALLIS CO.
Milwaukee 7, Wisconsin

LA-102

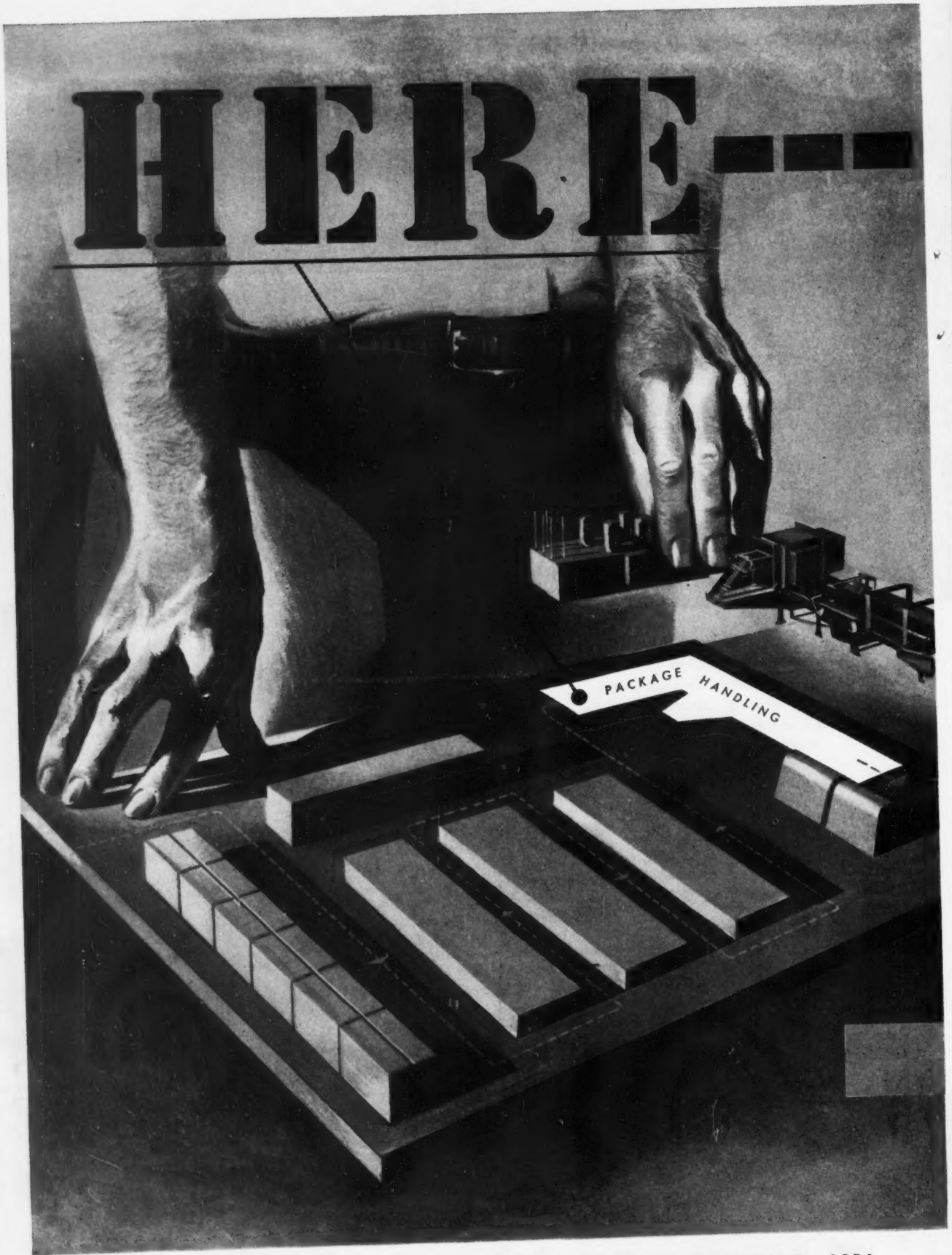


NEMA D-flange Motor

Vertical NEMA C-flange Motor

NEMA C-flange Motor

We specialize in SPECIAL MOTORS — *and* PROMPT DELIVERY, TOO



For more information, use coupon on page 159.

WHERE COSTS ARE HIGHEST---

STANDARD-KNAPP SAVES YOU MOST

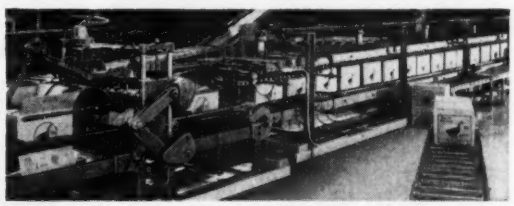
First, we don't waste your time in getting down to essentials. Our engineers talk your language, quickly understand your requirements and accurately interpret them in terms of package handling equipment.

The next point of savings is in the price of the equipment itself. We have a broad and versatile line of standard models and long experience in adapting them to specific requirements. You get a "customized" installation at the lowest possible cost.

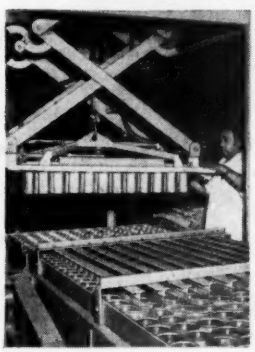
Next, we save you time in realizing the benefits from Standard-Knapp equipment. We train your operators, get them to know and like the machines, provide them with easy-to-read operating instructions.

Then, you can count on a strategically located service organization for prompt and competent assistance in keeping Standard-Knapp equipment at full efficiency.

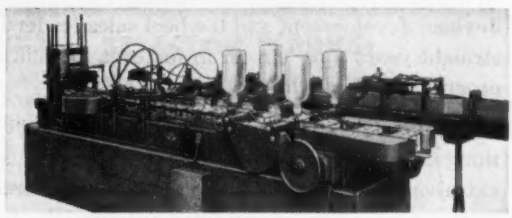
To save most where it counts the most, call in Standard-Knapp – whether you need a complete line of packaging equipment or a single machine.



ADOPTION OF FIBRE CASES by citrus fruit industry was expedited by gluing and sealing equipment developed by Standard-Knapp. Another instance of S-K's ability to engineer packaging equipment for maximum savings and efficiency.



EMPTY CAN PALLETIZING SYSTEM devised by Standard-Knapp speeds and simplifies delivery of empty cans to user, expedites introduction of cans into filling and processing lines. Another example of Standard-Knapp pioneering in better packaging methods.



SIX-PACKS HIT JACKPOT in popularity with beer consumers. Carton inserter (above) is key machine in line of equipment developed for brewing industry by Standard-Knapp. New line handles cans at rate of 500-600 per minute.

IN PACKAGING -- STANDARD-KNAPP EQUIPMENT IS AUTOMATICALLY MORE EFFICIENT

STANDARD-KNAPP

DIVISION OF EMHART MFG. CO.

PORTLAND, CONNECTICUT

For more information, use coupon on page 159.

INTERNATIONAL LEADS AGAIN...

NEWEST, FINEST BOGIE

IN THE 6-WHEEL FIELD

The new INTERNATIONAL bogie provides a new exclusive torque arm design straddle mounted at axle and frame, for greatly increased strength, and new rubber bushings on torque arms, equalizing beams and radius rods for reduced road shock, and elimination of 10 lubrication points. A new self-contained brake and cylinder unit cuts servicing costs, offers greatly increased protection from damage in off-highway operation.

Once again, INTERNATIONAL makes the big news in 6-wheel bogie design. Once again, the pioneer of 6-wheel development and 6-wheel sales leader for 19 straight years tops 'em all in features for efficiency, economy, and long life.

In today's INTERNATIONAL 6-wheelers you get everything that's new and everything that's best, plus such extra-value features as the famous, proved INTERNATIONAL power divider and third differential.

Ask your INTERNATIONAL Dealer or Branch for full facts . . . and a demonstration. You'll quickly see why —for off-the-road or over-the-highway—an INTERNATIONAL Truck with new INTERNATIONAL bogie is the world's best 6-wheel buy.

24 new 6-wheel models!

GVW ratings, 22,000 to 90,000 lbs. with new INTERNATIONAL bogie or trailing axle. Engines from 130 to 356 horsepower. Choice of gasoline or LPG power. Diesel engines available in models with GVW ratings of 30,000 lbs. and over. Transmissions, axle ratios for any needs. America's most complete truck line—170 basic models from ½-ton pickups to 90,000 lbs. GVW off-highway models.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

International Harvester Builds **McCORMICK**® Farm Equipment and **FARMALL**® Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

→ Get the News! Alex Dreier "Man on the Go," daily NBC Radio, sponsored by INTERNATIONAL Truck Dealers.

INTERNATIONAL® TRUCKS

"Standard of the Highway"

The answer to most of your questions about stainless steels are right at your finger tips, when you use Crucible's unique new Stainless Steel Selector.

Want to know the machinability characteristics of a stainless grade? Resistance to corrosion or scaling? Physical or mechanical properties? You can get the answers to these and other questions simply by setting the arrow on the Selector slide at the proper window. It's just as quick and easy as that.

And almost as fast as you get the answer, you can get the steel you need. For many of the REZISTAL stainless steels shown on the Selector are carried in stock in Crucible warehouses conveniently located throughout the country.

To get your free copy just fill in and mail the coupon. Better do it now.

HOW THE SELECTOR WORKS:

Start with the problem. For example, resistance to corrosion in contact with copper sulfate. Just set the slide at the proper index number shown on the Selector (in this case on the back), and you have the answer in a second – grades 302 and 316 are fully resistant to this form of attack.

Crucible Steel Company of America
Dept. FE, Henry W. Oliver Building
Pittsburgh, Pa.

Name_____

Company_____ Title_____

Address_____ City_____ State_____

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **STAINLESS STEELS**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • MAX-EL • ALLOY • SPECIAL PURPOSE STEELS

For more information, use coupon on page 159.

Here is Why!

You can dispense with oil filters and dust filters when you install ®Nash® Clean Air Compressors. You can save the cost of maintaining these devices. You can greatly reduce instrument maintenance costs. For the Nash employs no internal lubrication, therefore no troublesome oil is in the delivered air. Moreover, air from a Nash is thoroughly washed and cooled as it passes thru the pump. Dust in the plant atmosphere, even fly ash, is immediately removed.

®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

No oil filters.
No dust filters.
No internal lubrication to contaminate air handled.
No internal wearing parts.
No valves, pistons, or vanes.
Non-pulsating pressure.
Original performance constant over a long pump life.
Low maintenance cost.

NASH ENGINEERING COMPANY
395 WILSON, SO. NORWALK, CONN.

Now! Soy Sauce in a pouch bag!

made possible by

Du Pont

ALATHON*

polyethylene resin

Pouch bag for Chinese soy sauce given strength, flexibility and leak-proof heat-seal with coating of "Alathon"

This single-service pouch bag for liquid soy sauce is an example of how Du Pont "Alathon" polyethylene resin can be used to help solve many complex packaging problems.

To successfully package soy sauce in a pouch bag, the bag must be strong, flexible and moisture-resistant. The bag must resist deterioration from the oils in the sauce. It must have a leak-proof heat-seal, yet be easy to open without spilling. And, of course, any materials used must be tasteless, odorless and non-toxic.

A pouch bag constructed of a special paper made on a glassine machine with a 3-mil coating of Du Pont "Alathon" polyethylene resin on the inside fulfilled every requirement. "Alathon" in this thickness gave the bag extra strength and insured a leak-proof heat-seal. In addition, it helped make possible the ingenious tear-strip pouring spout at the top of the bag.

Because of its unique combination of properties, "Alathon" has helped develop many new packaging ideas. "Alathon" is tough and flexible over a wide range of temperatures—from tropical heat to 70° below zero... resists acids, alkalies and many greases. Consider the advantages "Alathon" offers in multi-ply, duplex or single-ply bags, chipboard containers and trays, fiber drums and cartons.

*REG. U.S. PAT. OFF.

DU PONT
REG. U.S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY
Polychemicals
DEPARTMENT
PLASTICS • CHEMICALS

WRITE FOR FREE BOOKLET

describing the properties and uses of "Alathon" in the packaging field, or simply mail this handy coupon. We'll gladly put you in touch with sources of supply for packaging materials coated with "Alathon."

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Dpt. 542, Du Pont Bldg., Wilmington 98, Del.

Please send me the new booklet on packages using coatings of "Alathon."

Check type of package most interested in: Multi-wall bags ( ). Single-ply and duplex bags ( ). Pouch bags ( ). Fiber drums & cartons ( ). Chipboard containers & trays ( ). Overwraps and innerwraps ( ). Other ( ).

*Name*_____

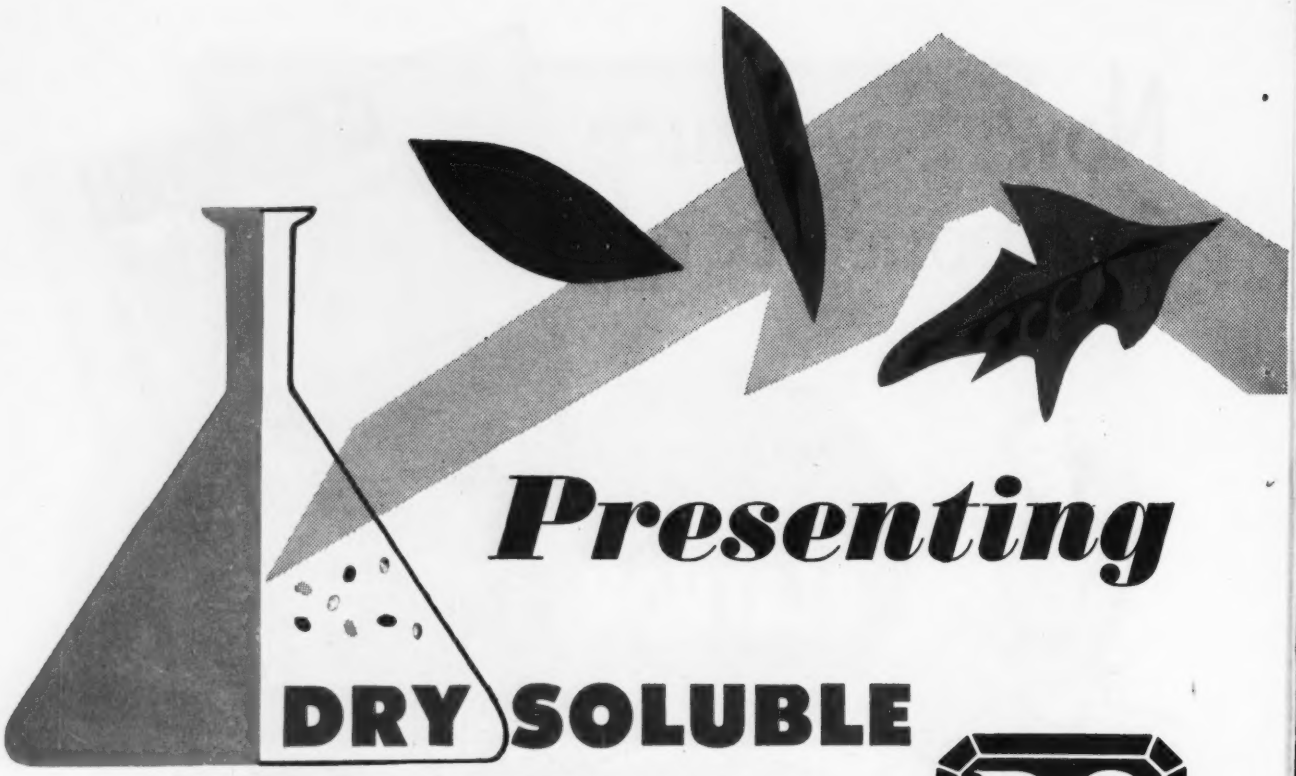
*Title*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

For more information, use coupon on page 159.



Presenting

DRY SOLUBLE SEASONINGS by D&O

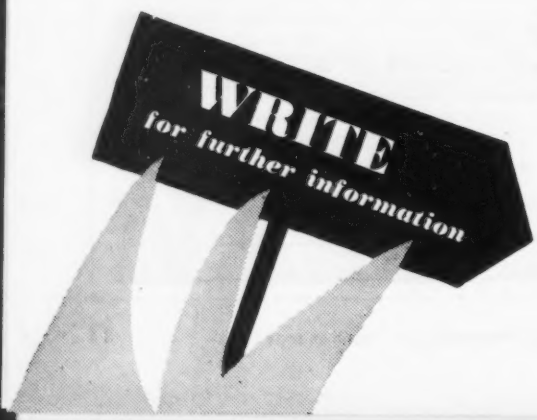
ESTABLISHED 1798

For more than 155 years

Dodge & Olcott, Inc. has supplied to various segments of the food industry, flavoring materials of unsurpassed excellence. D&O essential oils, oleoresins, and specialty flavor lines are known and respected throughout the trade and D&O's reputation for integrity, service and experience are unexcelled. Now, as a further service to the food processing industry, D&O presents its newest development...a complete line of *DRY SOLUBLE SEASONINGS.*

A special factory

has been built for the manufacture of this new line, complete with *all stainless steel equipment.* No metal contamination can occur... no dust or residual odors will be found. D&O Dry Soluble Seasonings are pre-packaged in batch lots per individual requirements and shipped in containers most suitable for particular item involved.



DODGE & OLCOTT, INC.

180 Varick Street • New York 14, N. Y.

SALES OFFICES IN PRINCIPAL CITIES

Tailor-made formulations

Basic formulations for all the most popular prepared meats, soups, pickles, dressings, and related food products are available to manufacturers to be used as a starting point for developing their own particular flavors. Infinite variations are possible and will be worked out in the D&O Flavor Labs to meet the exact requirements of each processor.

All M.I.D. requirements have been met!

D&O Dry Soluble Seasonings are made from 100% natural oils or oleoresins . . . all extractions and adjuncts are prepared with the finest raw materials obtained through the company's extensive international sources.

Guaranteed uniformity!

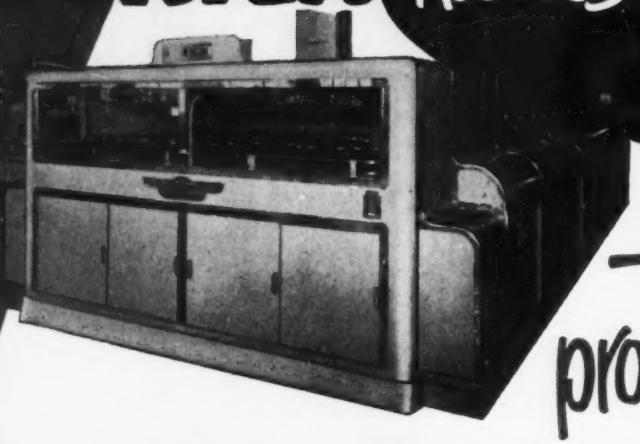
A complex quality control system insures consistent high quality, and individual technical service is available to food processors with specific problems in flavor development and control. Contact the D&O representative in your district or write for details on the latest D&O service to the food industry . . . *D&O DRY SOLUBLE SEASONINGS.*

. . . the Leadership Line of Dry Solubles

•

Founded in 1798

B-W VORTEX Assures AUTOMATIC EFFICIENT ECONOMICAL food processing



The famous Barry-Wehmiller Vortex is today being successfully used by more and more food processors in a wide variety of applications. Whether your processing requirements include cooling, freezing, pasteurizing or exhausting, you'll find the Vortex perfectly adapted to glass or metal containers for foods or beverages.

Operation of the Vortex is entirely automatic and continuous. Accurate dial control of operating speed assures correct processing time. Compact design conserves valuable floor space, and its gleaming, modern appearance appeals to the eye.

Engineering advantages include the patented B-W "walking beam" conveyor which moves containers through the process zone, yet the conveyor itself remains at the same temperature throughout the operation. This eliminates the usual cost of heating, cooling or re-heating the conveyor system. Hydraulic drive eliminates many gears and cam movements and has extremely low power requirements.

For many years of the most efficient, economical processing in your plant, specify the Vortex. Write for complete data and Bulletin 302 today.

SUN NEVER SETS ON B-W BOTTLE CLEANERS PASTEURIZERS & PROCESSORS

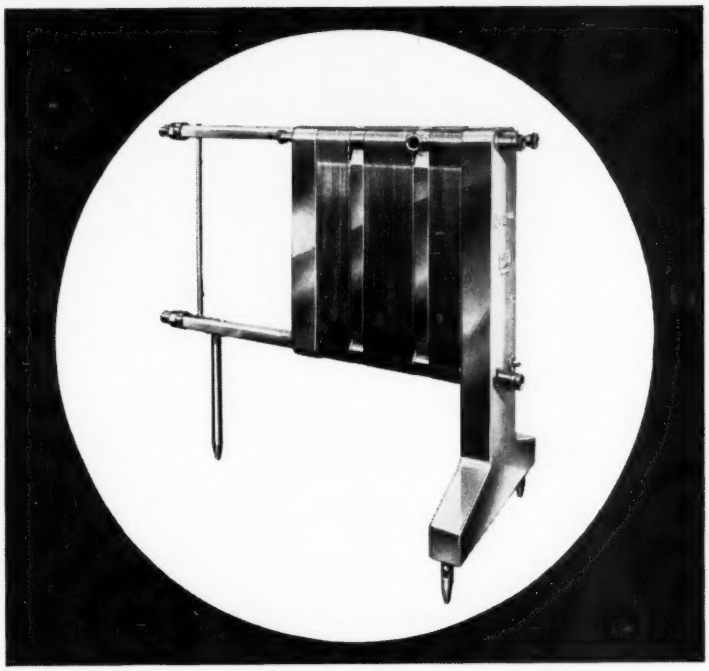
BARRY-WEHMILLER MACHINERY CO.

4660 WEST FLORISSANT AVENUE • ST. LOUIS 15, MO.

IN GREAT BRITAIN BARRY-WEHMILLER MACHINERY CO. LTD. HOUNSLOW MIDDLESEX

Announcing!

THE DE LAVAL PLATE HEAT EXCHANGER



FOR HEATING, COOLING and REGENERATION

The De Laval Separator Company announces its newest product—the De Laval Plate Heat Exchanger. Behind the De Laval Plate Heat Exchanger are many years of experience and successful performance, for it has been sold by the thousands in Europe and Canada where it is known as the Alfa-Laval Plate Heat Exchanger.

Throughout industry there are many processes that require the use of the Plate Heat Exchanger. The De Laval Plate Heat Exchanger offers a high heat transmission coefficient, ease of dismantling and cleaning, plus maximum heat recovery.

Simple, rugged design based on the principle of enlargement, the unit can be rebuilt or extended, as required. This feature will be fully appreciated in modern plants where adaptability is a major asset.

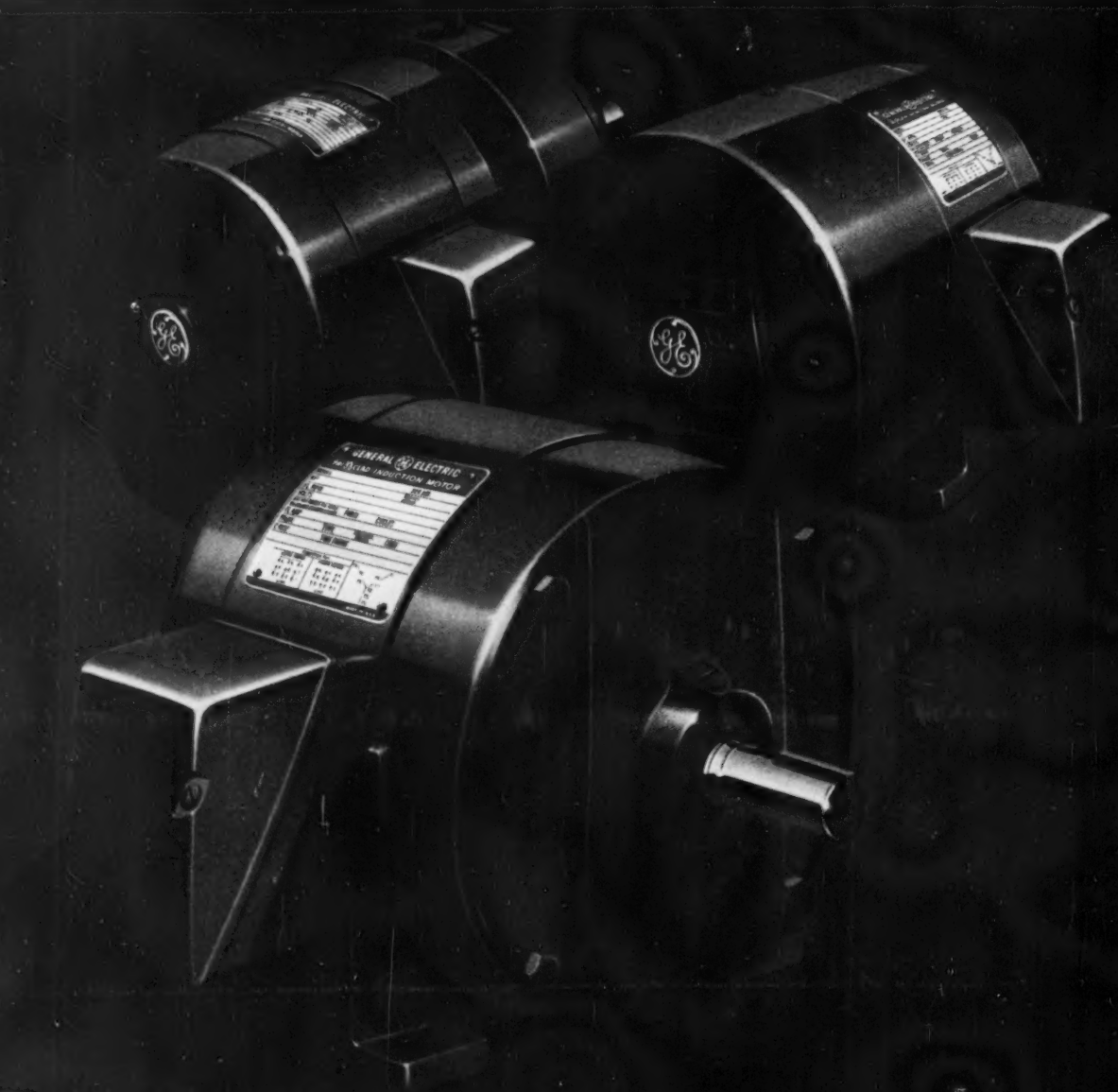
For complete information, please write and give us the details of your heating or cooling problem.

FEATURES OF THE DE LAVAL PLATE HEAT EXCHANGER

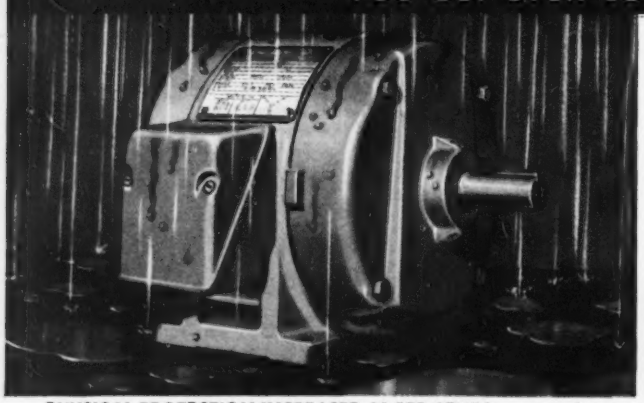
1. All heat-transmitting surfaces are accessible for inspection and cleaning.
2. Complies with sanitary requirements—designed for "in-place" cleaning.
3. Easy variation of assembly to meet changes in operation—plates are invertible (except Model P5).
4. Easy to assemble—special design for precision tightening—ball bearing tightening nuts with constant tension thrust washers.
5. Space requirements are small.
6. Unsurpassed heat transmission.
7. All parts which contact the liquid are made of highest quality acid-resisting stainless steel.
8. Heater, cooler and regenerative sections may be assembled in one unit.
9. Several liquids can be treated simultaneously in different sections of the same Heat Exchanger.
10. Liquid cannot leak from one section to another—liquid cannot become mixed with the heating or cooling medium.
11. Sturdy construction for high-pressure operation.
12. Gaskets are easily replaceable in the user's plant.
13. Highest quality instrumentation by Taylor Instrument Company.
14. Available in three sizes for a wide range of capacities.

De Laval PLATE HEAT EXCHANGERS

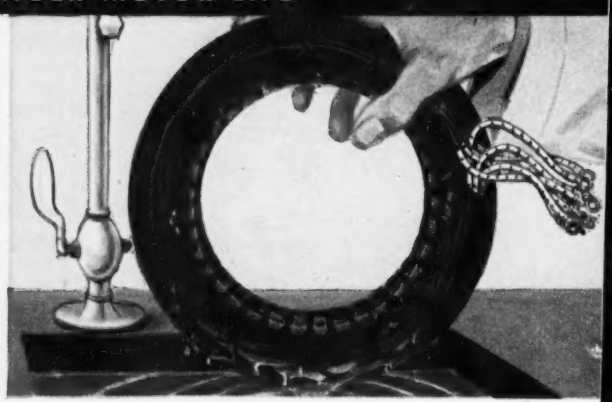
THE DE LAVAL SEPARATOR COMPANY · Poughkeepsie, New York · 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5



YOU GET EVEN LONGER MOTOR LIFE



PHYSICAL PROTECTION INCREASED 60 PER-CENT by a complete redesign of cast-iron frame and end shields. This motor is suitable for many jobs where ordinary dripproof motors should not be applied.



EXTRA ELECTRICAL STRENGTH is assured by use of new polyester film insulation. A silicone coating, Dri-film,* virtually eliminates stator insulation failure caused by moisture.

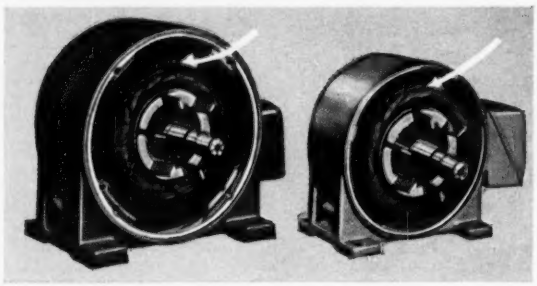
*REG. U.S. PAT. OFF.

TRI 55 CLAD THE LEADER IN MODERN MOTOR DESIGN

GENERAL ELECTRIC ANNOUNCES...

THE ALL-NEW TRI 55 CLAD MOTOR

REG. U.S. PAT. OFF.



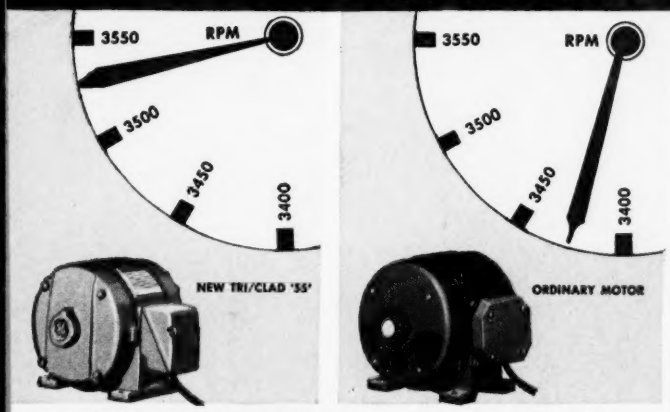
LIGHTER, SMALLER Tri/Clad '55' motors have been made possible through better use of space within the frame. Active materials (magnetic steel, copper) have not been sacrificed.

Complete Line of Dripproof, Enclosed Motors and Gear-Motors Available in Most Ratings in 1954

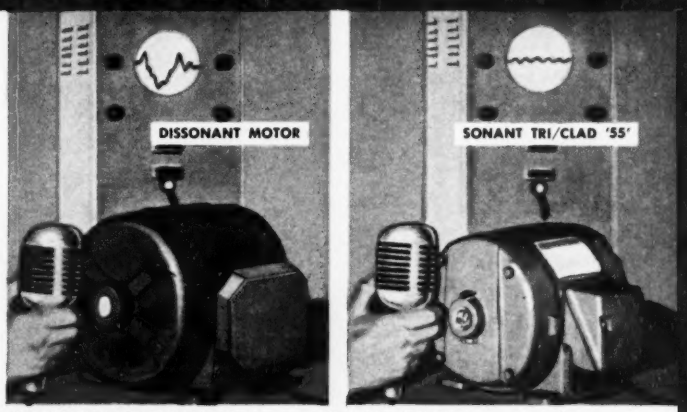
Here's the all-new Tri/Clad '55' motor — now available in NEMA 182 and 184 frame sizes.

You can get complete information on this dramatic motor achievement by writing for bulletin GEA-6013 on Tri/Clad '55' Dripproof motors, GEA-6012 on Tri/Clad '55' Enclosed motors, or GEA-6027 on Tri/Clad '55' Gear-motors, or by contacting your nearby G-E Apparatus Sales Office or G-E Motor Agent. General Electric Company, Section 648-1, Schenectady 5, N. Y.

YOU GET EVEN BETTER PERFORMANCE



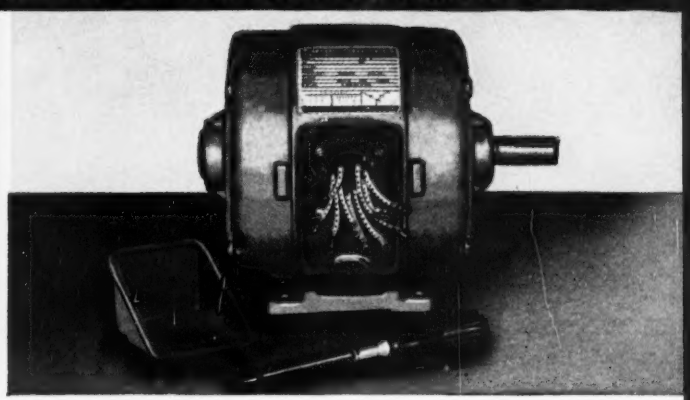
HIGHER FULL-LOAD SPEEDS is only one of many improved characteristics of this new G.E. motor. Above shows comparison of an ordinary motor with the Tri/Clad '55' — both rated at 3600 rpm.



SONANT OPERATION of the new Tri/Clad '55' motor has been laboratory tested and proven. Motor operates at reduced noise level, and operating sound is pitched to a more pleasant frequency.

YOU GET EVEN MORE INSTALLATION AND MAINTENANCE SAVINGS

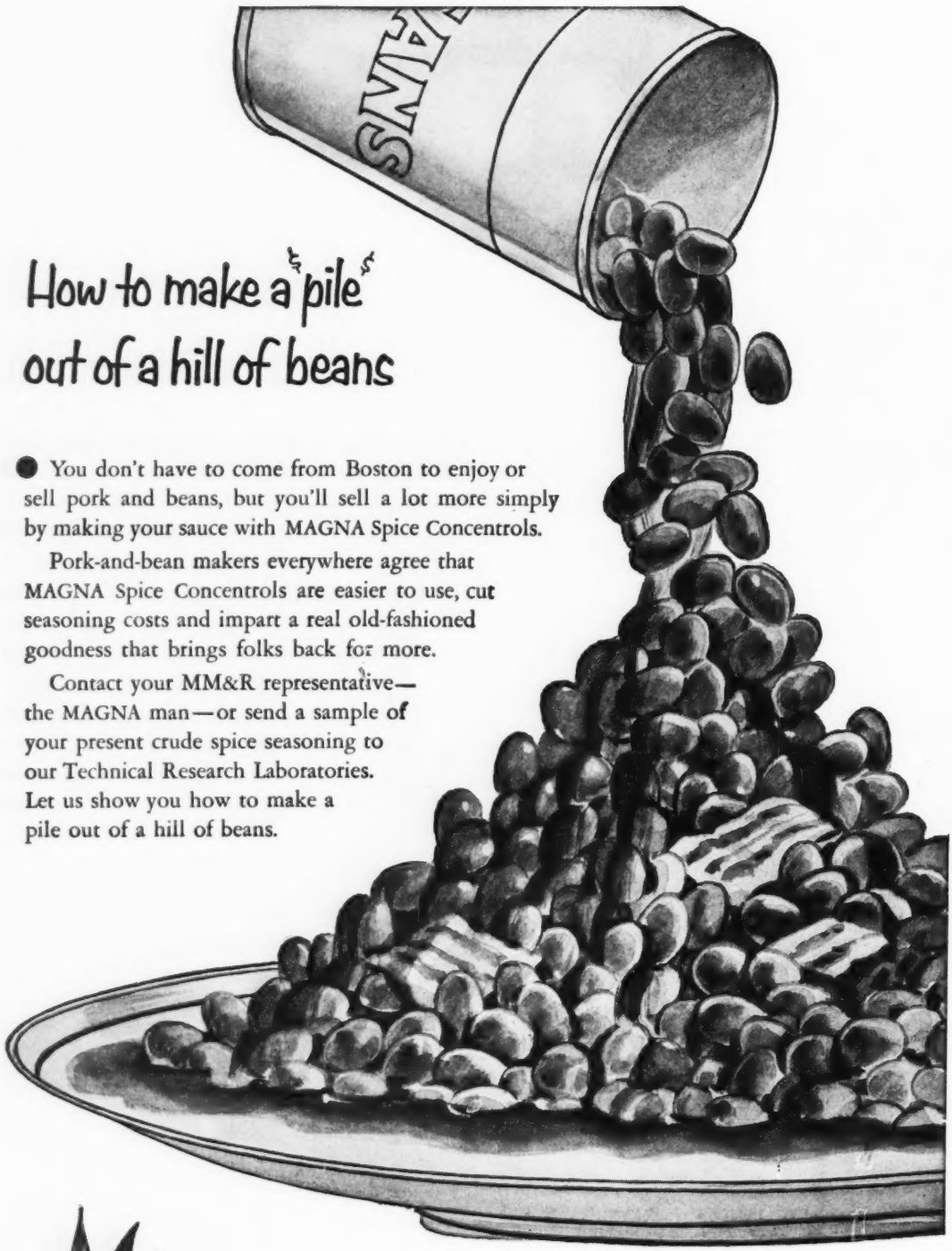
NEW BEARING SYSTEM allows this motor to run longer than other motors without regreasing. One reason—greatly improved synthesized grease with 8 times the mechanical stability of ordinary grease.



EASIER TO SERVICE, the new Tri/Clad '55' has larger conduit box diagonally split for simplified wiring. Perma-numbered leads mean that even clipped and stripped wires are instantly identified.

Progress is our most important product

GENERAL ELECTRIC



How to make a "pile" out of a hill of beans

● You don't have to come from Boston to enjoy or sell pork and beans, but you'll sell a lot more simply by making your sauce with MAGNA Spice Concentrols.

Pork-and-bean makers everywhere agree that MAGNA Spice Concentrols are easier to use, cut seasoning costs and impart a real old-fashioned goodness that brings folks back for more.

Contact your MM&R representative—the MAGNA man—or send a sample of your present crude spice seasoning to our Technical Research Laboratories. Let us show you how to make a pile out of a hill of beans.

M&R MAGNUS

Magnus, Mabee & Reynard, inc.

Since 1895 ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS

16 Desbrosses Street, New York 13, N. Y. · 221 North La Salle Street, Chicago 1, Illinois

This printing is HERE to stay!

IT WON'T PEEL, FLAKE OR RUB OFF FILM MADE OF "BAKELITE" Polyethylene

Look how your packaging can benefit from film made of BAKELITE Polyethylene. Names and trade-marks last indefinitely. Eye-catching designs and colors give your package extra sales appeal. Product identification is immediate and displays are brighter and more effective.

At the same time, film made of BAKELITE Polyethylene protects merchandise in a strong, transparent, moisture-proof covering that keeps it clean and saleable. It offers excellent product visibility and resists tearing, cracking and abrasion. Bags made from this pliable film can be closed by sewing, stapling, heat-sealing or tying.

This is but one example of the many packaging uses for versatile BAKELITE Polyethylene. It is also molded into squeeze bottles, flexible tubes and laminated to foil and cellophane to give heat-sealability and added strength. Get to know more about this useful material. Write to Dept. TS-74.

Produce Bags by **Milprint Packaging Materials,** 4200 N. Holton Street, Milwaukee 1, Wis.

BAKELITE
TRADE-MARK
Polyethylene

BAKELITE COMPANY
A Division of Union Carbide and Carbon Corporation UCC
30 East 42nd Street, New York 17, New York

For more information, use coupon on page 159.

"WE INCREASED OUTPUT 1,440 UNITS PER SHIFT

Since Installing a *Lincoln* Centralized Lubrication System"

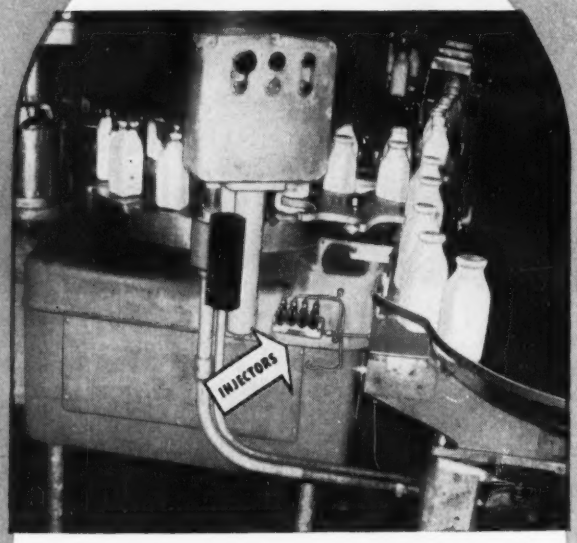
says H. L. SPROULE, Plant Superintendent TWIN PINES DAIRY, INC., Detroit, Michigan

"We formerly were required to keep an oil can handy so operators could squirt oil on the cap carriers of our Hooder machines. But, because of the high temperature, even this method was inadequate. Periodically the carriers would become dry and bind, shutting down the machines. Our Lincoln CentrOmatic* Lubrication System not only solved this problem, but now we can be sure all bearings are getting the right lubricant at the right times.

"This method has increased our output 1,440 units per 8-hour shift. Maintenance costs are sharply reduced and the morale of the operators has been improved. We can certainly recommend the Lincoln System highly."

H. L. Sproule

*Trademark Registered



Arrow indicates four of the seven SL-3 injectors that protect vital bearings on each of the dairy's three machines.

Closeup showing the Lincoln Model 1805 manually operated Pump installed on a Sealright "Sealon" Hooder machine.

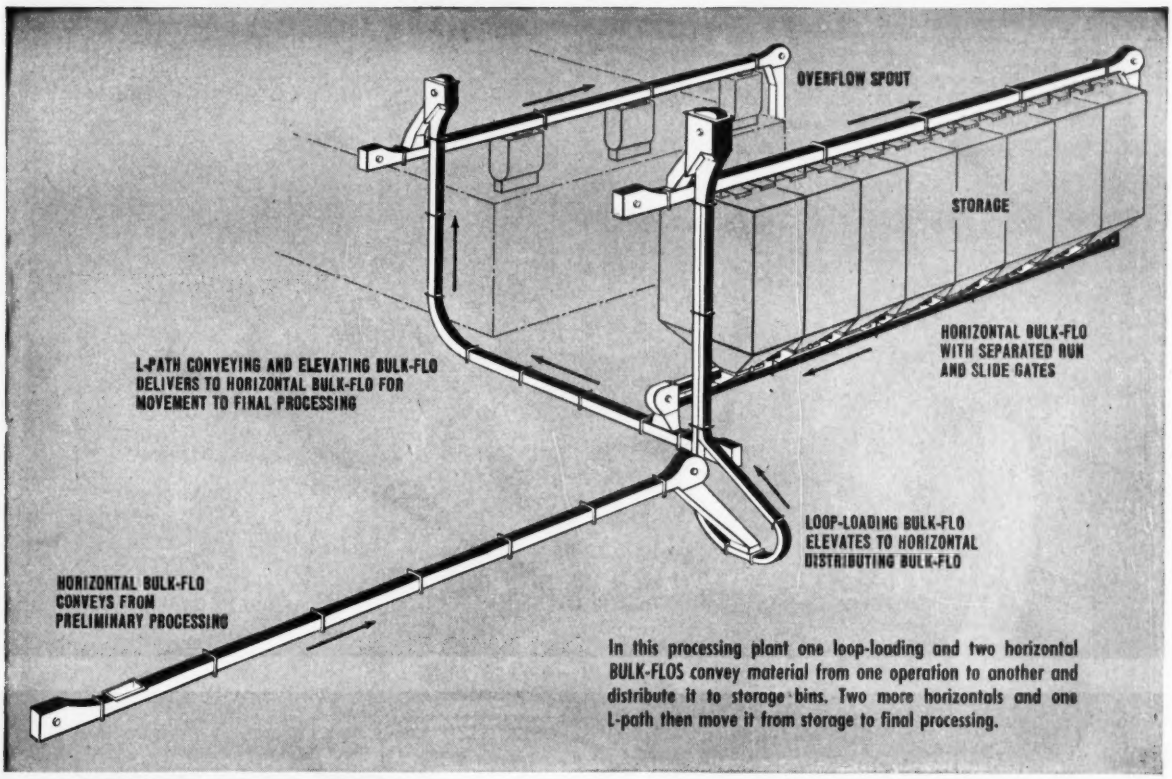
Lincoln Centralized Lubrication Systems can make PRODUCTION GAINS like these in your plant: Increase bearing life up to 1500%... reduce power consumption... eliminate down-time for lubrication... eliminate possibility of contamination of food... reduce labor costs. Catalog 80 gives you complete details on these and other advantages. Write for your copy.

• • • PIONEER BUILDERS

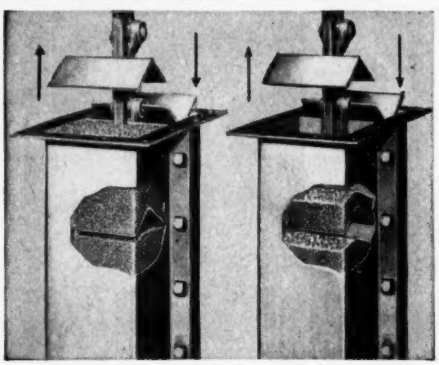
LINCOLN ST. LOUIS LUBRICATING EQUIPMENT • • •

LINCOLN ENGINEERING COMPANY • 5781 Natural Bridge Ave., St. Louis 20, Missouri

Link-Belt BULK-FLO combines feeding - conveying - elevating . . .


OVERFLOW SPOUT
STORAGE
HORIZONTAL BULK-FLO WITH SEPARATED RUN AND SLIDE GATES
L-PATH CONVEYING AND ELEVATING BULK-FLO DELIVERS TO HORIZONTAL BULK-FLO FOR MOVEMENT TO FINAL PROCESSING
LOOP-LOADING BULK-FLO ELEVATES TO HORIZONTAL DISTRIBUTING BULK-FLO
HORIZONTAL BULK-FLO CONVEYS FROM PRELIMINARY PROCESSING

In this processing plant one loop-loading and two horizontal BULK-FLOS convey material from one operation to another and distribute it to storage bins. Two more horizontals and one L-path then move it from storage to final processing.



Fully or partially loaded—Link-Belt BULK-FLO provides positive, gentle movement of material. Self-clearing through intermediate runs, it prevents contamination.

to cut your handling costs

NOW—with *one* fully enclosed assembly—you can replace several handling units in less space . . . at lower cost. BULK-FLO combines three functions in one, offers true versatility in bulk material handling.

Operating independently of internal pressure, its solid flights provide positive, variable movement of material even at less than full capacity. BULK-FLO is gentle, too—individual "compartments" protect the material.

There's a wide range of designs that can be engineered to match your system requirements. For complete information, call your Link-Belt office, or mail the handy coupon included here for your copy of Book 2475.

LINK-BELT

BULK-FLO
FEEDERS - CONVEYORS - ELEVATORS

13,204

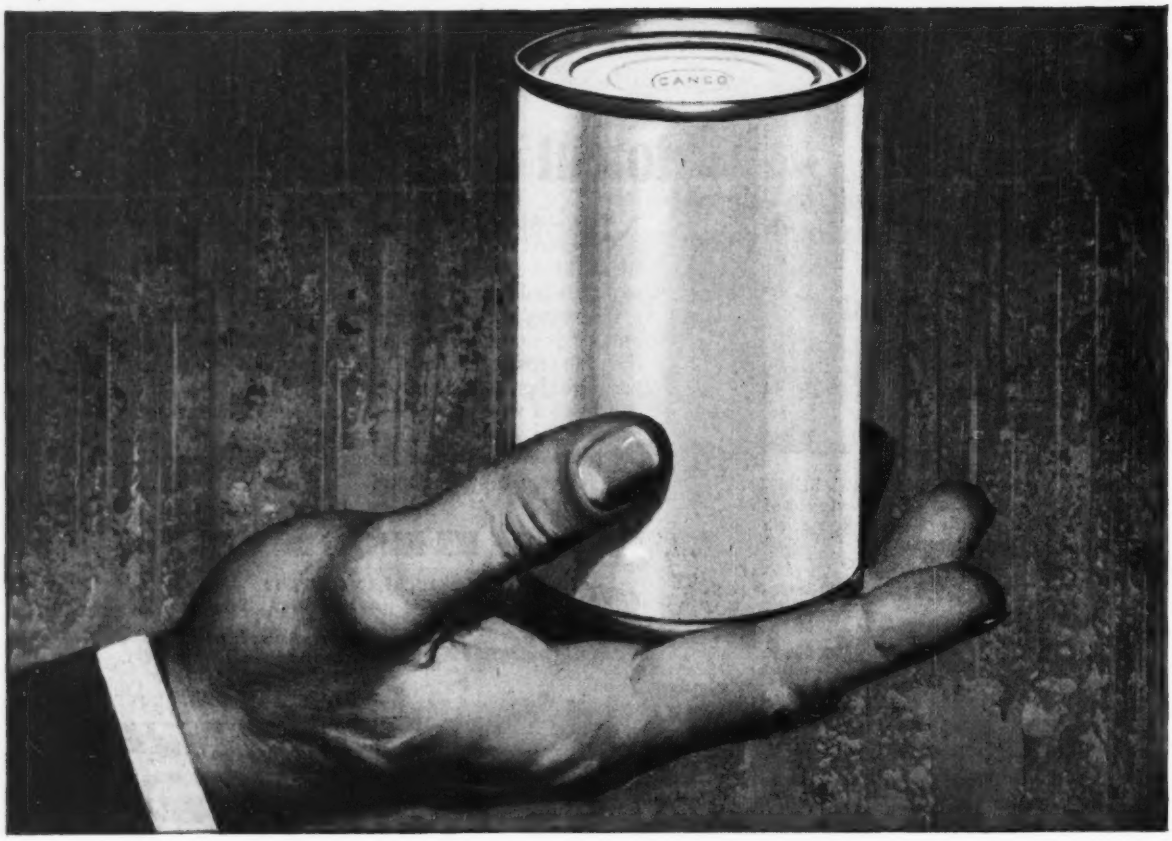
LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices in Principal Cities.

LINK-BELT COMPANY
Address your nearest office

Please send me immediately a free copy of your 28-page BULK-FLO Book 2475.

Name_____
Firm_____
Address_____
City_____ Zn__ State_____

For more information, use coupon on page 159.


CANCO

The cans are different, but not the customers

Between the "hole and cap" can—now a collector's item—and today's streamlined Canco food container is a half century of progress.

Yet, many of the companies which purchased Canco's early cans are still on Canco's roster of staunch friends. Perhaps *your* company is one of them.

Why have so many companies—large and small—*consistently* done business with Canco? Because their experience has proven this:

Canco offers an unequalled combination of able people, conveniently located plants, research leadership, technical assistance, delivery service, quality and experience. As a result, packers get *what* they want . . . *where* they want it, and *when!*

If your company is not enjoying Canco services, isn't *right now* the time to start?

Go first to the people who are first!

AMERICAN CAN COMPANY

CANCO

New York, Chicago, San Francisco; Hamilton, Canada

These are but a few of the familiar meat cans that have provided housewives with a wide variety of easy-to-serve dishes—given a tremendous boost to sales of meats and meat products.

For more information, use coupon on page 159.

New Chevrolet Trucks for '54

Loaded with brand-new advantages you need and want!

You'll get more work done in less time and at lower cost with new '54 Chevrolet trucks on the job. They bring you more new features . . . more big new advantages than any other truck on the road.

For example, you get new engine power in all models. The advanced "Thriftmaster 235" engine combines bigger displacement and higher compression with other new features to give you greater power and finer performance. The rugged "Loadmaster 235" engine offers increased strength and stamina for heavier trucking operations. The all-new "Jobmaster 261" engine* brings you extra reserves of high-compression power for hauling big loads on schedule.

In addition, you enjoy new and even greater operating economy. All three 1954 Chevrolet truck engines bring you the full benefit of thrifty high-compression power.

And there are many, many more new things you'll like about these great new Chevrolet trucks. New, roomier pickup and stake bodies let you haul more . . . save you time and extra trips. And they're set lower to the ground for easier loading and unloading. New truck Hydra-Matic transmission* lets you drive all day without shifting. It's offered not only on ½- and ¾-ton Chevrolet trucks, but on 1-ton models, too. New Comfortmaster cab with one-piece curved windshield and amazing new Ride Control Seat* offers the last word in comfort, convenience and safety.

Plan now to see your Chevrolet dealer and get all the facts about the new Chevrolet trucks for '54. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Most trustworthy trucks on any job!

CHEVROLET

ADVANCE-DESIGN TRUCKS

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

THREE GREAT ENGINES—The new "Jobmaster 261" engine* for extra heavy hauling. The "Thriftmaster 235" or "Loadmaster 235" for light-, medium- and heavy-duty hauling. **NEW TRUCK HYDRA-MATIC TRANSMISSION***—offered on ½-, ¾- and 1-ton models. Heavy-Duty **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **DIAPHRAGM SPRING CLUTCH**—improved-action engagement. **HYPOID REAR AXLE**—for longer life on all models. **TORQUE-ACTION BRAKES**—on all wheels on light- and medium-duty models. **TWIN-ACTION REAR WHEEL BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—greater holding ability on heavy-duty models. **NEW RIDE CONTROL SEAT*** eliminates backrubbing. **NEW, LARGER UNIT-DESIGNED PICKUP AND PLATFORM STAKE BODIES**—give increased load space. **COMFORTMASTER CAB**—offers greater comfort, convenience and safety. **PANORAMIC WINDSHIELD**—for increased driver vision. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—easier, safer handling. **ADVANCE-DESIGN STYLING**—rugged, handsome appearance.

**Optional at extra cost. Ride Control Seat is available on all cab models, "Jobmaster 261" engine on 2-ton models; truck Hydra-Matic transmission on ½-, ¾- and 1-ton models.*

MORE CHEVROLET TRUCKS IN USE THAN ANY OTHER MAKE!

DOW PROPYLENE GLYCOL, U.S.P. FOR FINER FOOD FLAVORS

This high purity solvent is more economical for an extremely wide range of flavoring raw materials

Dow propylene glycol, U.S.P., has gained wide acceptance among manufacturers of fine food flavors for its highly efficient solvent action on a wide and varied range of flavoring raw materials.

Many manufacturers of food colors for both bulk and household use have improved their products with propylene glycol . . . with only slight alterations in basic formulations. Emulsified flavors, too, benefit from the wetting action of propylene glycol, which increases the stability of the emulsions.

To aid you in evaluating Dow propylene glycol, U.S.P., as a replacement for other more expensive and less effective solvents, we will be glad to send you a free sample and further information. Send your request to THE DOW CHEMICAL COMPANY, Midland, Michigan. *Dept. OC-1799E.*

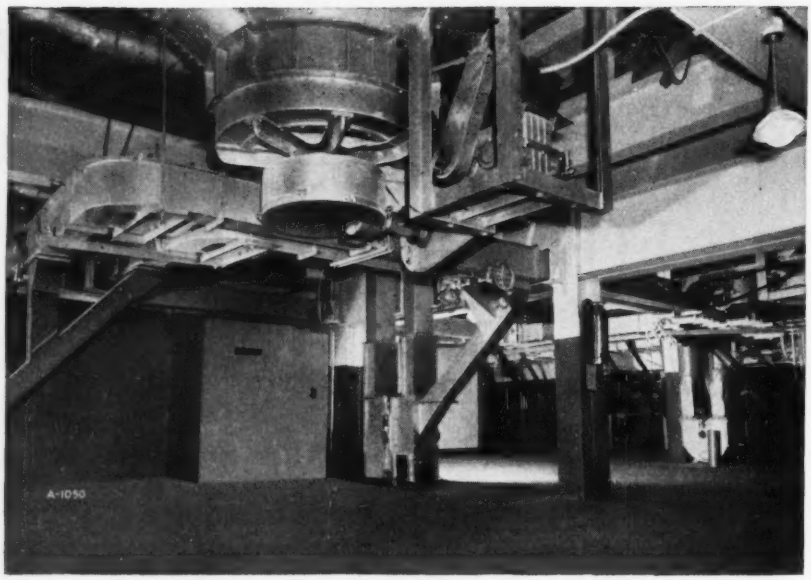
you can depend on DOW CHEMICALS

DOW

For more information, use coupon on page 159.

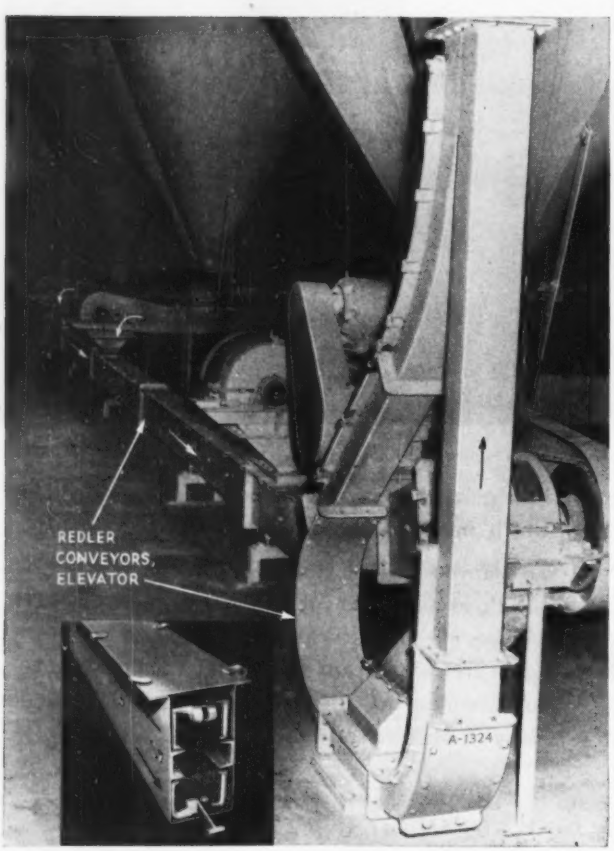
KEEPS MALT ON THE LEVEL

This S-A Circular bin discharger prevents any arching of malt and corn grits in bins as it feeds steady flow to S-A REDLER Side-Pull Conveyors. This installation, engineered by S-A, is one of several at a Brooklyn brewery. Testimony of performance is the fact that repeat orders for additional REDLERS have been included in plant additions and alterations over the past 10 years.



Mechanized Bulk Food Handling—

Short-Cut to Lower Operating Costs



Food manufacturers are finding new operating savings through conveying systems designed for bulk handling of solid food materials. This modern method of handling cuts manpower requirements and handling time, improves sanitation of food and plant cleanliness, and, in many cases, permits more complete automatic control of processes.

Specialists in bulk materials handling for more than fifty years, Stephens-Adamson has designed and built many of these efficient food handling systems! A few are pictured and described here.

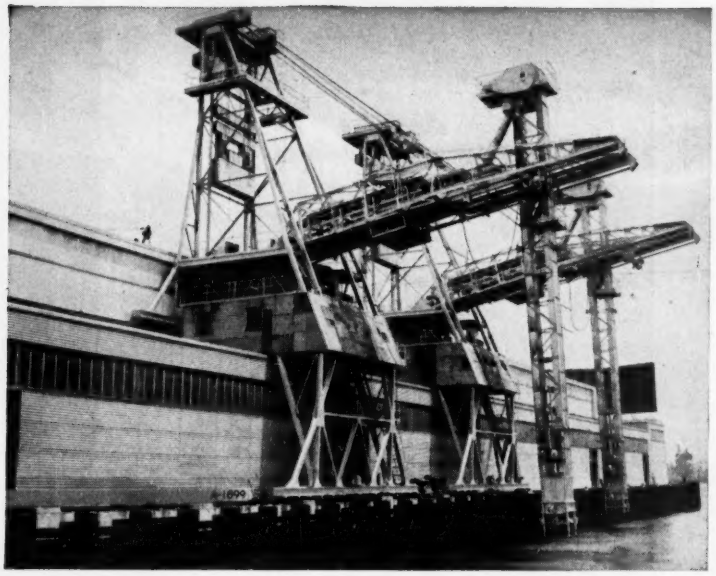
Because S-A manufactures a complete line of bulk handling equipment, S-A engineers can recommend without bias the equipment and system that exactly meets your needs.

If the cost of moving bulk materials in your plant is excessive, ask to have an S-A engineer make a free survey. There's no obligation—and the results may show you unsuspected opportunities for saving.

GRAIN TO BEER AT 10 TONS PER HOUR

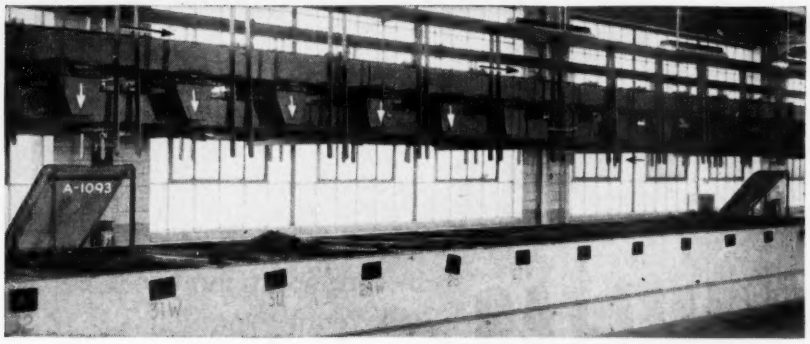
At a Minneapolis brewery, these S-A REDLER conveyor-elevators are part of a completely mechanized storage and recovery system for corn and rice grits. REDLERS (at left) take grain from storage bins and feed main REDLER running to loop boot elevator unit. Ten tons of grain per hour are elevated 69 feet to scale hopper above — with clean handling in minimum space assured by the REDLER'S fully enclosed, compact design.

For more information, use coupon on page 159.



SUGAR FROM SHIPS—FASTER

Twin Marine leg type S-A unloading gantries handle sugar from bulk cargo ships at a rate of 250 tons per hour each at this East Coast refinery. Gantry lowers bucket elevator into hold where scrapers draw sugar to loading point. Bucket elevator unloads onto telescoping conveyor on boom. From there, sugar flows via a short transfer conveyor to a fixed conveyor running the length of the dock. Smooth, mechanized handling of high tonnage at low cost!

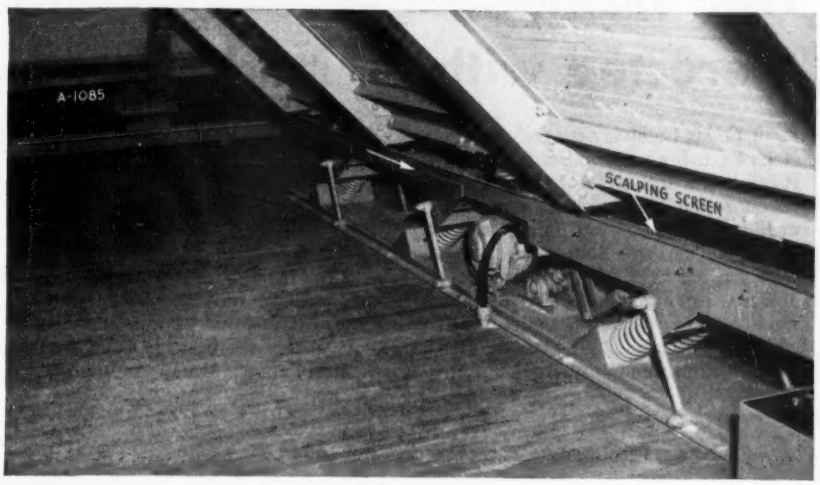


MORE CANDY CAPACITY

Completely mechanized handling of cocoa beans, nibs and powder helps this maker of chocolate products to meet growing demand for their output. At the Fulton, New York plant, S-A REDLER conveyors and elevators have replaced old style conveying systems and hand trucking. At left, nibs are carried over long row of storage bins by REDLER run-around units. Lever operated gates allow discharge into any desired bin. Nibs will continue to circulate without jamming if bins are already full.

SALT DOES A SHIMMY

One of eight S-A "Natural Frequency" conveyors at a Texas salt plant is shown at right. Vibrating at the natural frequency of its coil springs, this conveyor utilizes the regenerative power of coil springs to convey and scalp salt flakes and granules at capacities to 25 tons per hour. Economical to operate, these units convey at a speed of 60 feet per minute with only a one H.P. motor! REDLER conveyors also in the plant handle salt at temperatures as high as 300°F.



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Standard Products Division
A complete line of conveyor accessories including centrifugal loaders—car pullers—bin level controls—etc.

SealMaster Division
A complete line of industrial ball bearing units available in both standard and special housings.

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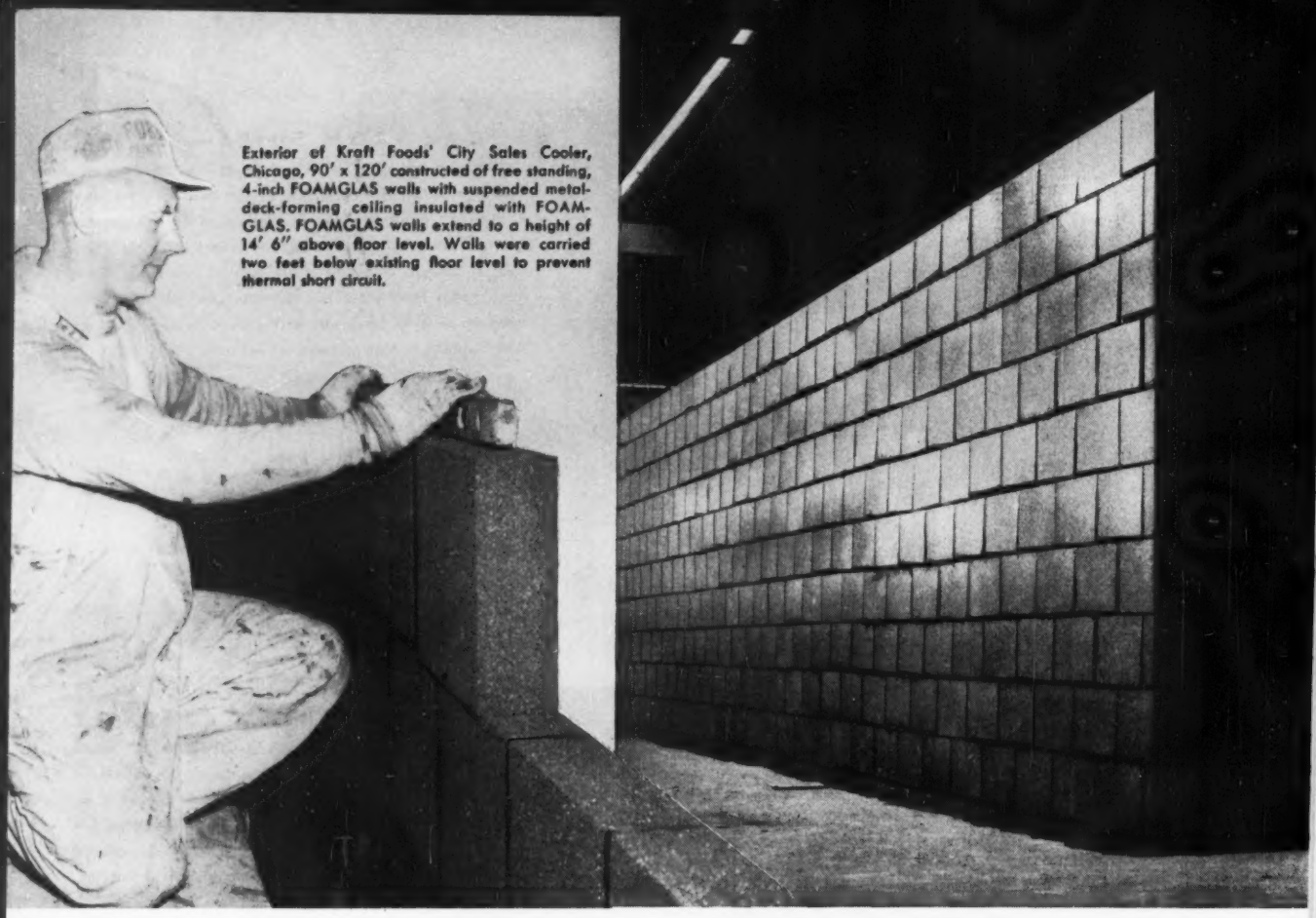


Exterior of Kraft Foods' City Sales Cooler, Chicago, 90′ x 120′ constructed of free standing, 4-inch FOAMGLAS walls with suspended metal-deck-forming ceiling insulated with FOAMGLAS. FOAMGLAS walls extend to a height of 14′ 6″ above floor level. Walls were carried two feet below existing floor level to prevent thermal short circuit.

Free standing FOAMGLAS insulating walls, erected without studs, cut costs for KRAFT

Kraft Foods Company cut construction costs by using the high compressive strength and rigidity of FOAMGLAS to construct two coolers *within* the existing structure of their Food Storage Building in Chicago. Substantial savings were realized by Kraft when they were able to use the unique strength and rigidity of FOAMGLAS to erect self-supporting free standing FOAMGLAS walls without temporary studs . . . to construct the coolers *and* insulate them in one step with one quality material.

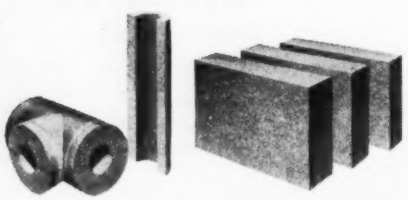
With free standing FOAMGLAS construction, Kraft got not only strong, durable walls and inner partitions, but outstanding insulation performance as well. Since FOAMGLAS *can not* absorb damaging moisture, it maintains *constant* high insulating efficiency without costly maintenance. Moreover, FOAMGLAS is fire-proof, rot-proof and vermin-proof.

Let FOAMGLAS work for *you* . . . by giving you constant, lasting insulating efficiency plus unique design advantages. Send now for a sample of this remarkable insulation and our new booklets covering use of FOAMGLAS to insulate walls, ceilings, roofs, floors, piping and equipment in refrigerated structures or normal temperature buildings. Write, indicating your specific interest, to Department O-24 . . .

PITTSBURGH CORNING CORPORATION • One Gateway Center • Pittsburgh 22, Pa.

FOAMGLAS®

the cellular, stay-dry insulation



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Now, you can have the YALE TRUCK you need on lowest monthly charges . . . after a small down payment. You get immediate, cost-cutting use from America's best-known Industrial Trucks . . . have years to pay.

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The length of leasing period depends entirely on your requirements. But, whatever you choose, no capital outlay is required . . . and the monthly rentals are often tax deductible as current operating expenditures.

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Get the advantages and savings of the straight lease plan: no initial cash outlay . . . small monthly rentals . . . immediate use. But, you can arrange for full title by paying an additional sum at end of contract period.

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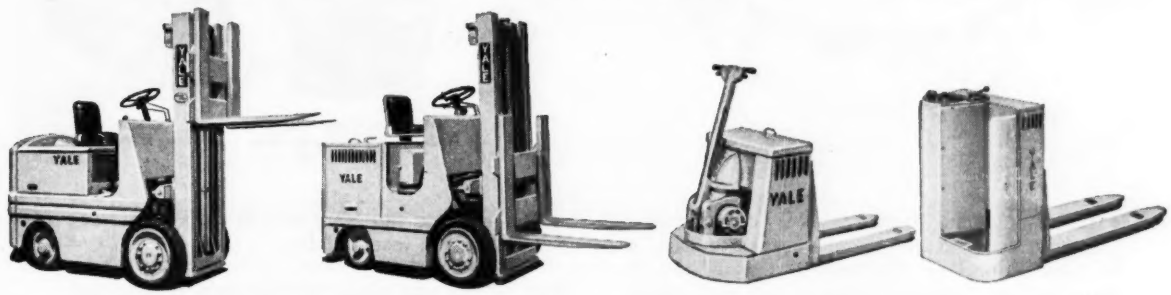
And, every YALE TRUCK . . . Gas, Electric, Diesel, LP-Gas . . . is the finest of its type . . . the modern mechanized equipment that, for many firms, has cut handling costs in half . . . then in half again.



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PUNISHMENT PIT—

COME BETTER FANS FOR YOU

"Buffalo" Type "BL" Limit-Load Ventilating Fan

"Buffalo" Axial Flow Fan

• To be sure that "Buffalo" rotors can stand far greater stress than they would ever encounter in an installation, we deliberately try to destroy them in this "Buffalo" vacuum test pit! Here, in a partial vacuum, the rotor to be tested can be revolved at tip speeds as high as 60,000 and even 70,000 feet per minute. The slightest unbalance, the slightest structural weakness, would result in destruction of the rotor at these fantastic speeds — and it shows up here in the Punishment Pit, not in the installed fan.

This is just one phase of the rigid testing and excellence of engineering, or "Q" Factor*, which assure you of a best buy when you specify "Buffalo" Fans. Why not write for "Buffalo" engineering literature on *your* air handling problem?

**The "Q" Factor — The built-in Quality which provides trouble-free satisfaction and long life.*

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PAINLESS CONVERSION in action at Lee Baking Co. (Campbell Taggart Associated Bakeries, Inc.) Macon, Ga.

KEEP RUNNING FULL BLAST

WHILE DREHMANN REPLACES UNFIT FLOORS WITH MAINTENANCE SAVING SANI-BRICK

Don't let unfit floors play hob with sanitary standards and increase your overhead burden. At the outset of breakdown call upon Drehmann for PAINLESS CONVERSION to long-life, trouble-free Sani-Brick.

Thanks to PAINLESS CONVERSION—a highly successful installation method developed by Drehmann—this work can be done without shut down or slow down. Indeed, you can operate at capacity while Drehmann lays sparkling new Sani-Brick right over your old worn floors.

Time tested performance has proven Drehmann Sani-Brick the ideal food plant floor. No floor of any other type can touch Sani-Brick for architectural beauty, high sanitary properties and low cost maintenance. Likewise unmatched is the ability of Sani-Brick to withstand high impact, abrasion, constant moisture and corrosives.

If any of your floors show signs of cracking, pitting or rotting, call in a Drehmann engineer for corrective action—fast.

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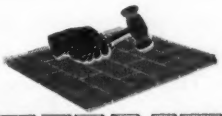
DREHMANN HAS THE FLOOR  FOR MODERN INDUSTRY

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—SANI-BRICK FLOORS—

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pH in food processing

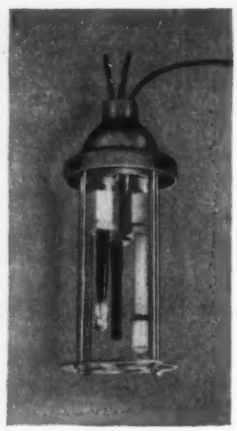
Making better food products at lower cost . . .

ACIDITY and alkalinity are more than a matter of taste in food products. They are chemical characteristics that influence many food qualities and processing operations. Through the application of modern instrumentation, these characteristics can be readily measured and often controlled automatically.

What is pH?

Chemists have devised the pH scale as a means of expressing the acidity or alkalinity of a solution. The scale extends, for all practical purposes, from 0 to 14. The numbers are a way to measure the concentration of hydrogen ions in a solution. Pure water has a pH of 7. Below 7, solutions are acid; the more acid, the lower the pH number. Conversely, alkaline solutions have a pH value above 7, and keep getting higher as they become more strongly alkaline. The scale is logarithmic; a change of 1 pH means a ten-fold change in the hydrogen ion concentration.

Flow type electrode assembly.



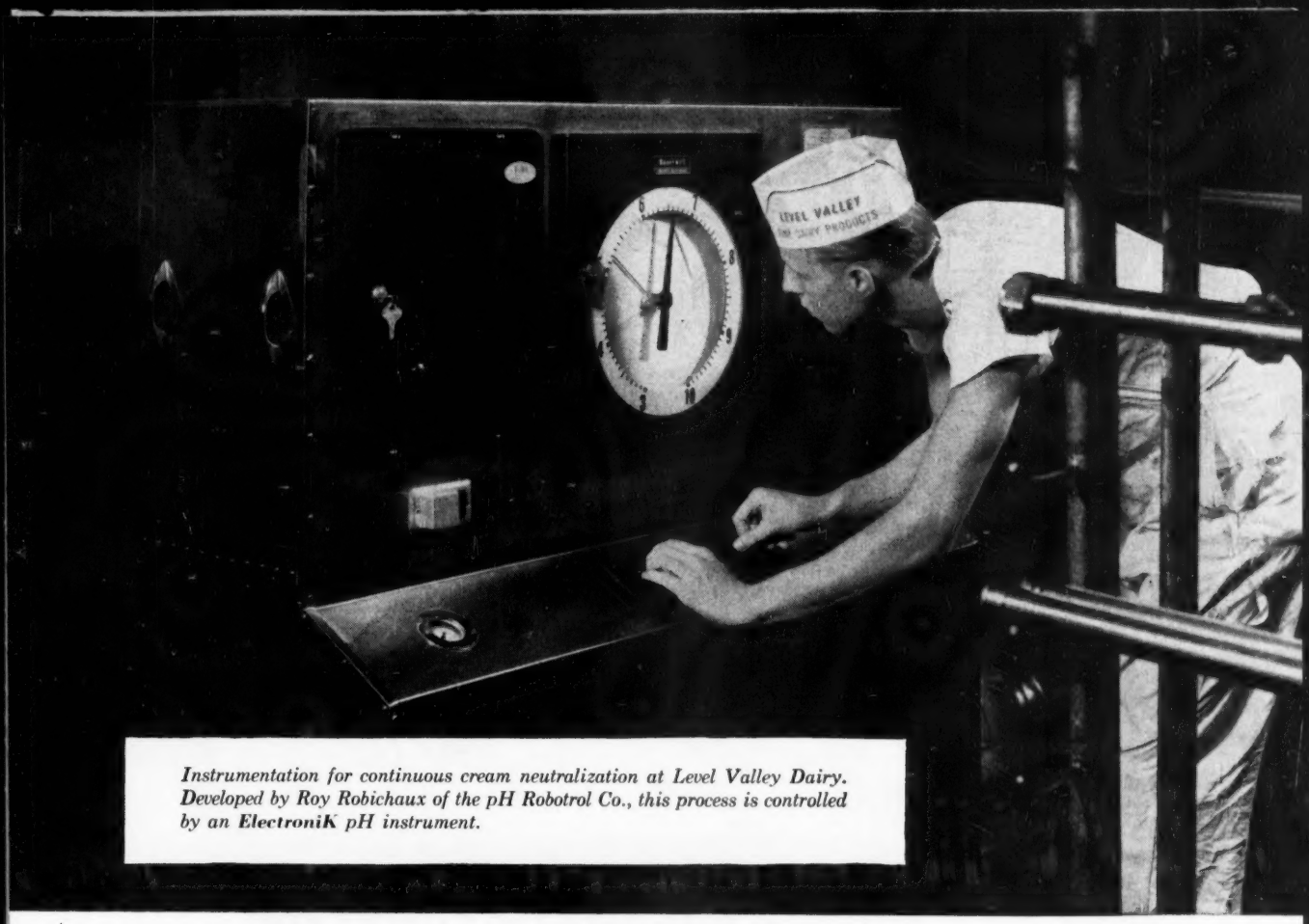
Immersion type electrode assembly.

How is it measured?

Formerly requiring elaborate laboratory equipment, pH measurements are made today in many industries by means of the glass electrode system. This consists of a pair of elements, one of which has a special glass bulb at its tip, continuously immersed in the solution to be tested. The electrical millivoltage which this system develops is measured by an electrometer and is recorded directly in pH units by an *ElectroniK* potentiometer.

How about control?

The *ElectroniK* pH instrument can often regulate the flow of a corrective reagent to hold pH at a set value . . . thus eliminating the uncertainties of manual operation. For instance, if a product is slightly acid and it is desirable to make it neutral, the instrument actuates a valve to adjust the addition of an alkaline solution. pH control requires engineering by a Honeywell specialist, who takes into consideration such factors as reaction time, buffering action and process lags. When properly designed, pH control can make valuable contributions to product quality, uniformity and economy in many food processes.



Instrumentation for continuous cream neutralization at Level Valley Dairy. Developed by Roy Robichaux of the pH Robotrol Co., this process is controlled by an ElectroniK pH instrument.

. . through automatic pH control

THE WAY that modern instrumentation can help convert a hit-or-miss batch process into a closely regulated, continuous operation is well exemplified by the continuous cream neutralization system at the Level Valley Dairy, West Bend, Wis. Under the control of an *ElectroniK* pH instrument, this process automatically adjusts the acidity of cream going through a continuous pasteurizer. Here, as in other dairies where the *pH Robotrol* process is operating, several outstanding benefits are being realized.

Improved flavor—no oxidized taste, no "tallowiness" from overneutralization.

Longer storage life—butter stays fresh longer; doesn't get "fishy" due to over-acidity.

Faster production—continuous, fully automatic process eliminates delays of batch operation; ends need for accumulating cream receipts before processing. Many plants can double daily production!

Honeywell instrumentation offers food processors unlimited opportunity to improve efficiency and product quality. At your service is a thorough line of measuring and controlling instruments encompassing practically every food process—plus an extensive background of engineering experience in the control problems of the industry. Your nearby Honeywell sales engineer will be glad to discuss your own plant's applications . . . and he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Aves., Philadelphia 44, Pa.

● **REFERENCE DATA: Write for Catalog No. 1550 and Instrumentation Data Sheet No. 3.4-9.**

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

ANYONE CAN BUILD A PNEUMATIC CONVEYOR...

It's true! Anyone can build a pneumatic conveyor—*of some sort.* Of course, it won't be efficient . . . it won't streamline your materials handling operations . . . and it won't reduce your handling costs — but it will be a pneumatic conveyor.

However, in solving your bulk materials handling problems, you will want to investigate Dracco Airstream Conveyors. Each high-efficiency, automatic Airstream Conveying system is:

1. Designed for a cost-saving solution to your specific handling problem.
2. Designed accurately by engineers having many years of experience exclusively in this field.
3. Constructed of quality materials for long, trouble-free service.

If you are handling bulk granular or powdered materials, remember that Dracco Airstream Conveyors possess unique advantages over any other type of system.

DRACCO CORPORATION
Harvard Ave. and E. 116th St., Cleveland 5, Ohio

Bulletin 529 presents complete, technical information on handling bulk materials with Dracco Airstream Conveyors. Write Dept. F-8, Cleveland 5, Ohio, for your copy.

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Airstream **CONVEYORS · DUST CONTROL EQUIPMENT**

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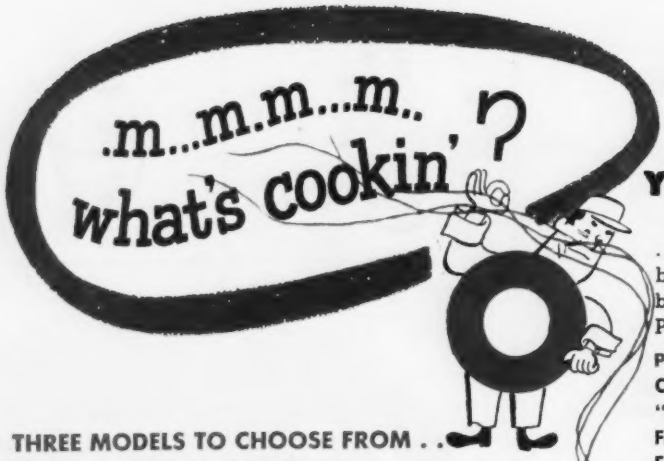

ALMOST ANY HEAVY BODIED LIQUID YOU CAN THINK OF

. . . can be heated, cooked, pasteurized, mixed, blended, cooled and held in refrigerated storage by heavy-duty, all-purpose Cherry-Burrell Round Processors.

PRODUCTS NOW BEING PROCESSED INCLUDE:

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Frostings
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Marshmallow
Orange Juice Concentrate
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Buttermilk
Chocolate Milk
Cream
Evaporated Milk
Market Milk
Skim Milk
Sour Cream
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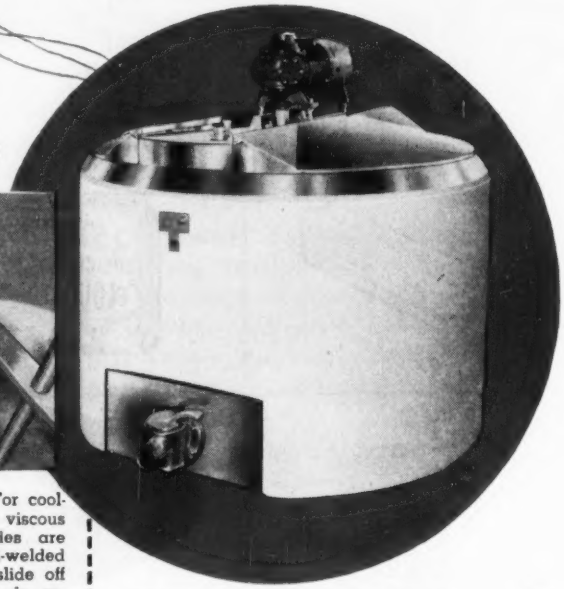
Superheated Condensed

THREE MODELS TO CHOOSE FROM . . DEPENDING ON YOUR NEEDS

Model "WP": For fast, uniform heating to high temperatures with direct steam vapor or re-circulated hot water through spray rings at both top and bottom of vat. Rapid cooling with well, city, tower or sweet water. Capacity: 300 to 1000 gal.

Model "EP": Enclosed waterway pressure channels on sides and bottom assure fast heating with hot water or steam; efficient cooling with well, city or tower water. For low-temperature cooling, Model "EP" uses refrigerated water. Zone control available. Capacity: 300 to 1000 gal.

Model "DP": Only heavy-duty vat available that heats with steam vapor and cools by a combination of recirculated water and direct expansion. A self-contained, direct expansion combination cold wall and pump spray cooler. Best bet for low-temperature cooling where ice bank systems are not available. Capacity: 300 to 1000 gal.



CHOICE OF TWO TYPES OF REMOVABLE AGITATORS

Long Sweep Agitator: High back, stainless steel blades on removable agitator provide thorough mixing and blending. Feathered blade ends keep product from climbing walls, even at high speeds. Adjustable, removable baffle keeps foam at minimum. Two-speed agitator.

Scraper Blade Agitator: For cooling extra heavy bodied and viscous liquid products. Scraper blades are hard plastic, mounted in an all-welded stainless steel frame. Blades slide off for cleaning. Entire agitator is removable.

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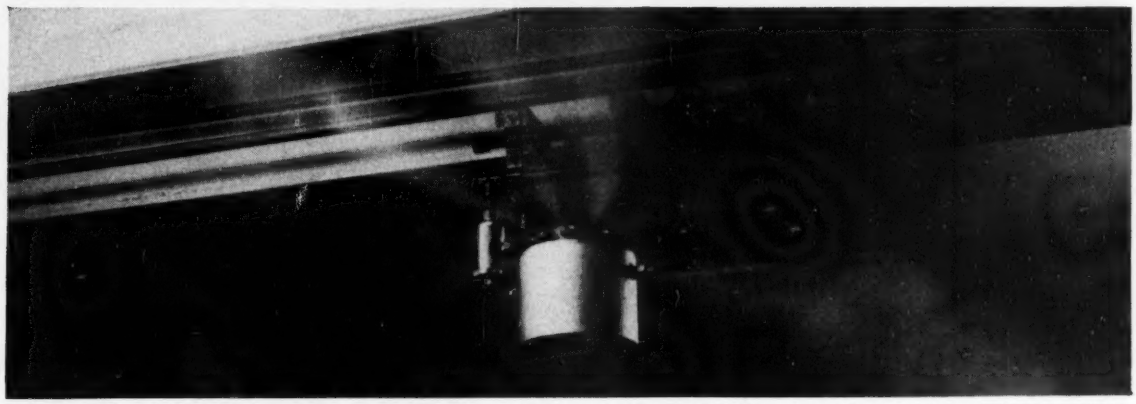
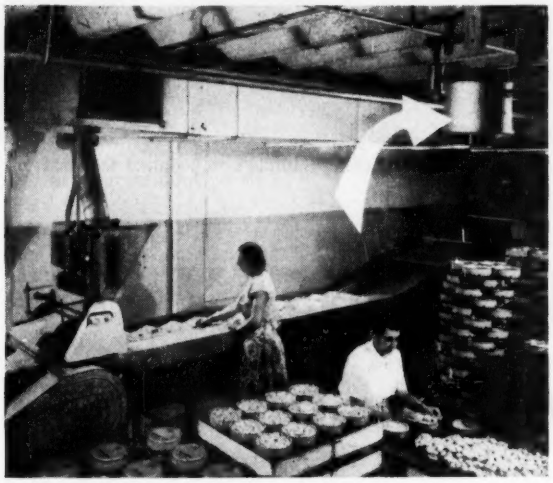


PFFT goes bug-killing fog from one of 14 self-feeding atomizers in Brown & Haley plant. One pipeline carries insecticide from roof-mounted storage drum. Other line is connected to air compressor.



ATOMIZERS (arrows) are spotted in strategic areas throughout confection plant. Left photo: Fogging unit covers 100,000 cu. ft. of space in candy-packing room with specially formulated, safe-to-use insecticide. Right photo: Another atomizer plays anti-bug role in finished-goods storage area.

"Absolute Insect Control"

Special lethal, fogging atomizers, fingertip operated from a main air-pressure valve, save candy-maker $1,500 yearly and four days' production

KEITH M. INGOLD

Manager, Seattle District, West Disinfecting Co., Long Island City, N. Y.

Long ago, Brown & Haley Co. of Tacoma, Wash., recognized insect control as a most essential phase of its plant sanitation.

And so this firm, one of the oldest and largest candy makers on the West Coast, spared no expense in keeping its operation abreast of the latest development in this field.

Several years ago, the plant was completely piped—at considerable cost—for controlling insects with cyanide gas. At that time, this method was hailed as the last word in such control.

Then in 1952, after a thorough evaluation of this system and a study of new developments, B&H made a new move: West Disinfecting Co., of Long Island City, N. Y., was called in to survey the layout and make recommendations for a system of improved control.

There followed installation of self-feeding type atomizers throughout the plant. These atomizers, made of zinc-free aluminum, are equipped with ten specially designed, internal-suction type brass nozzles that are machined to close tolerances.

The atomizing devices operate from an air compressor that supplies the propelling force. Each unit delivers West Vaposector—a specially formulated insecticide—in the form of a dry fog comprising lethal microscopic

(Turn to page 138)

QUICK-ACTION Steinlite unit. Here, extract sample is being poured into test cell. Sample's impedance to passage of high-frequency current is read on simple scale as indicator of fat content.

STREAMLINED ASSAY Sharpens Product Control

Armour's new, rapid, instrument fat test actually bests ponderous standard procedure in precision . . . Technique seen valuable as quality-control check

H. P. FURGAL
Research Div., Armour and Company, Chicago

Tedious laboratory determinations—while usually vital routine—rarely add any "plus" values to modern food processing.

Take the standard test for fat content in such items as hamburger, pork sausage, and other fresh and dried sausage. This assay should be made frequently to pinpoint economy, legality, and quality in these finished products. But it involves a routine 16 hr. extraction with ether.

Small wonder that such a method is practically useless as a working control during manufacture. The product usually is long past packaging and in storage by the time its results are known. Hence its prime function is really to detect lots with extra-legal fat before a possible damaging shipment.

In an effort to develop a more dynamic fat assay which might also serve in active quality control, our laboratory recently surveyed various "quick-test" instruments. Primarily sought was a rapid method that would equal the standard test in accuracy and could be universal in use. Simplicity, low-cost, and precision were also looked-for attributes.

Fortunately, our studies revealed a unit—the Steinlite LOS Fat Tester—which notably satisfied these criteria, with its—

- **Telescoped assay time of 20 min., at a cost of only 15-17c. per test.**
- **Improvements in precision and dependability over ether extraction.**
- **Ability to test accurately any type fatty meat, including cured items.**

Essentially, the Steinlite unit measures the high-frequency impedance of a solution of fat in solvent. This sample is located in a test cell whose wall and central electrode actually comprise the concentric members of a capacitance cell. Principle is that the amount of impedance to passage of high-frequency current through the sample varies markedly and regularly with fat content and shows up as a simple scale reading.

Procedure Details

The following steps are involved in this relatively simple new fat assay:

1. Weigh a 50g. sample to ±1g.
2. Extract in Waring Blendor with 100 ml. Steinlite Solvent No. 1. specially blended ortho-dichlorobenzene) for period of 4 to 10 min.
3. After extraction add filter-aid

(Celite) and filter through Buchner funnel over Munktell's No. 5 paper.

4. Bring clear extract within temperature range of instrument—between 79-91 deg. F.

5. Pour extract into cell, connect electrode, and read appropriate scale.

6. Lift electrode, allow extract to flow over temperature sensing unit, and read temperature.

7. Refer scale reading (step No. 5, above) to standard chart, read fat percentage, and correct for temperature to actual fat content.*

Compare this routine to the standard procedure listed in the *A.O.A.C. Methods of Analysis* (6th Edition), under Sec. 28.6 and 27.25. Here, a 2g. sample—meticulously dried as per a 2 hr. electric oven procedure—is extracted in a Soxhlet for 16 hr. with anhydrous ether. The sample is then dried again, and loss in weight is reported as its ether or crude-fat extract.

Numerous comparative assays on the same samples were run to estimate relative precision and accuracy of the two tests (see accompanying Tables I and II). Here even cursory examination of results indicates a consistency in the new method which more than hints at improvement.

Statistical Proof

However, for definite evaluation of the two assays, a more searching study by statistical analysis was undertaken.

Referring to Table I, the statistical analysis reveals that whereas no significant difference exists in accuracy (P.10), the new test is definitely more precise (P.02).

Pointing to this improved precision is the fact that the standard sampling error for the Steinlite instrument is 0.71%, while ether extract involves a 1.83% error. Hence, the 95% limits of these standard errors are 1.92% for the new test and 3.2% for the old standard method.

From the above it is evident that in any series of determinations one could be confident, 95% of the time, that true fat content of any one analysis would be within ±1.92% if achieved by the new method, while only within ±3.2% of value reported when employing ether extraction. Thus, in terms of number of samples required by each method for comparable precision, it would be necessary to run 2.75 ether extracts for every Steinlite determination.

This greater precision—or accurate "repeatability"—of the new method is not surprising when one compares the sample size involved. Ether extraction calls for a sample of 2g., while a 50-g. sample is used in the Steinlite assay. Hence, this larger sample size should generally serve to favor precision.

Since any fat assay should be widely applicable in use, the new method was also evaluated on meats other than hamburger (see Table II).

Statistical analysis, when comparing the two methods on a series of meat products, again shows no significant difference in accuracy (P.08). However, if projected on a series of tests for each product, there is no doubt that gain in precision would still prevail.

Aside from the above, however, there still existed the chance that curing salts might be affecting the reading. So, to test this possible effect, sodium nitrite and sodium chloride were added to both pure solvent and to solvent containing fats (see Table III).

It is apparent—in studying Table III—that the salts commonly used in curing do not affect the Steinlite instrument and make it quite suitable for use on cured meat products.

In addition to its precision and universality, the new method holds much promise as a rapid yet accurate determination whose very economics will

* Conversion chart of scale values to fat percentages was prepared at Fred Stein Laboratories, Atchison, Kan.

These Data Pinpoint Method's Performance

TABLE I—Steinlite and Ether Extraction Analysis of Fat in Hamburger

Sample	Steinlite				Ether Extraction			
	1	2	3	Ave.	1	2	3	Ave.
22	22.40	21.45	20.04	21.3	20.5	19.5	21.3	20.4
	22.24*	21.14	20.36					
24	24.16	24.48	23.92	24.2	24.7	24.6	24.0	24.4
26	25.42	26.35	25.62	25.7	24.9	25.8	24.7	25.1
		25.85	25.14					
27	27.70	27.86	26.06	27.1	26.0	26.7	27.7	26.8
	27.02	27.54	26.25					
28	27.84	28.34	27.54	27.8	26.2	27.7	27.5	27.1
	27.68	28.02	27.35					
29	28.94	29.24	29.42	29.2	27.9	28.1	29.8	28.6
	28.94	29.28	29.54					
30	28.92	28.28	29.40	28.9	28.2	29.5	30.6	29.4
	28.96	28.36	29.24					
A	28.44	30.92	29.68	29.68	28.3	28.6	29.6	28.8
	28.40	30.27	29.32					
B	28.90	29.20	30.29	29.46	27.5	31.6	31.1	30.1
	28.90	29.20	30.31					
C	32.25	31.83	32.02	32.03	20.8	35.2	32.1	32.7
	32.00	31.74	32.02					
D	33.58	33.38	33.26	33.41	32.4	33.0	31.6	32.3
	33.68	33.48	33.28					
E	35.19	36.75	36.39	36.11	34.7	34.3	34.8	34.7

* Second reading in each column represents a replication on same solution and is not really a different sample.

TABLE II—Fat Analysis by Steinlite and Ether Extraction of Various Meat Products

Sample	Percent Fat				Percent Fat			
	Steinlite			Ave.	Ether Extraction			Ave.
Lab frank mix	34.12	35.65	35.30	35.02	33.6	33.3	34.9	33.9
Lab frank mix and 3% salt	31.16	32.77	30.04	31.32	32.8	33.7	32.5	33.0
Frank emulsion* (plant)	27.34	27.80	27.32	27.37	27.3	27.4	27.2	27.3
Finished franks (plant)	35.51	35.47	34.48	35.15	34.4	34.5	34.5	34.5
Plant pork sausage	56.24	56.11	56.36	56.23	50.5	57.4	60.0	56.0
Lab mix pork sausage	43.76	43.57	44.95	44.09	44.9	41.8	47.2	44.6
Thuringer finished	25.76	26.07	26.29	26.04	27.0	26.8	....	26.9
Salami finished	38.89	38.85	38.36	38.70	37.7	38.1	....	37.9

* Frankfurter emulsion was extracted for 10 min. in Waring Blendor. This longer period seems necessary in view of low results obtained after a 4-min. extraction.

TABLE III—Effect of Curing Salt Addition on Steinlite Readings

Sample	Instrument Reading		Average
	1	2	
Solvent	51	48	49.5
Solvent plus $NaNO_2$ 5 mg/100 ml	49	50	49.5
Solvent plus $NaNO_2$ 10 mg/100 ml	49	48	48.5
Solvent plus 3% NaCl	49	49	49
	Fat Percentage		**Average**
	1	2	
Blank	34.04	34.00	34.02
Blank + 5 mg/100 ml. $NaNO_2$	33.56	33.92	33.74
Blank + 10 mg/100 ml. $NaNO_2$	33.72	33.72	33.72
Blank plus 20 mg/100 ml. $NaNO_2$	33.96	33.92	33.94
Blank plus 3% NaCl	34.18	34.18	34.18

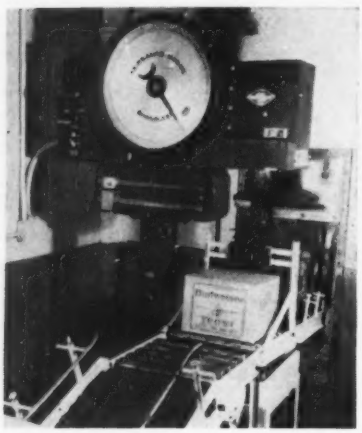
probably foster wide adoption. The fact is, exclusive of the salary of the operator and cost of meat sample, this new test only requires an expenditure of 15-17c. per determination. And while an individual assay requires 20-30 min., sequential tests can be made at 10 min. intervals.

True, the quick test does have some negative aspects. Perhaps the chief one is the noxious odor of the solvent used. If the test were to be employed anywhere near a process line, it would undoubtedly be necessary to house it in a separate room with an exhaust fan. Use in the laboratory, of course, eliminates this problem.

Another slight problem involves the fact that assay limits of this instrument as supplied range from approximately 17 to 60%. Some extension of the lower limit is possible, but higher fat contents can only be determined by dilution of the extractions.

But even with these limitations, the Steinlite instrument has undeniable usefulness wherever rapid, accurate, and reliable fat determinations are needed as a dynamic check in meat handling.

● ● ●



Cartons scaled . . .

. . . underweights marked . . .

. . . And readily detected

Robot Weigher-Counter Acts Quick on Misfills

FAST, ACCURATE weighing of packages of yeast is accomplished by a new high-speed system in operation at both the St. Louis and Newark plants of Anheuser-Busch.

System employs a Printomatic (Fairbanks-Morse) conveyor scale, which being fully automatic requires no supervision by a weighmaster or attendant. In 8¼ sec. the unit weighs, counts, and makes a permanent printed record of every 50-lb. carton leaving the packaging department.

Should any of the cartons be over or under the specified weight, including allowances for evaporation and packaging materials, the scale actuates a series of visual and audible alarms in various parts of the plant. The carton is automatically marked by a solenoid-operated crayon for separation and eventual return to the processing.

Wrapped 1-lb. cakes of yeast are automatically packed, 50 at a time, into cartons. Filled cartons move along a conveyor belt to the glueing and sealing machine. Spaced mechanically at 9-sec. time intervals, they are relayed to the scale.

As each carton on the conveyor approaches the scale, it is picked up by an inclined power belt and fed to the weighing platform via a roller track. Just before reaching the platform, it passes over a cycle start switch that sets the scale mechanism in operation.

Cartons Positioned

The carton is halted in the correct position on the platform by a ball-bearing, spring-loaded stop gate. The dial indicator is "bottomed" at the 47-lb. 6-oz. mark and "topped" at the 52-lb. mark. This reduces indicator travel, overshoot and hunt time. Indicator quickly registers the carton's correct weight, coming to rest in 7 sec.

Within 8¼ sec. after the start switch was first tripped, the cycle is completed and the weight of the carton is recorded on a continuous tape wound inside the Printomatic enclosure. The carton is also electrically counted on a remote panel board.

Upon completion of weighing, a lower solenoid is actuated and the stop gate is raised, allowing the carton to roll off the inclined roller-track platform to a belt conveyor.

When a carton is found to be underweight, two red lights flash. One is at the scale, the other is in the production room, where a horn sounds too. At the same time a solenoid-operated lever performs two operations: Its upper end trips a lever on the mechanical counter, registering the carton as underweight at the scale; and its lower end, to which a crayon is attached, marks the carton for eventual separation in the shipping room. The carton is also electrically counted as underweight on a remote board.

If overweight, a green light flashes both at the scale and in the production room, where a gong also sounds in this instance. Carton is counted as overweight on remote panel board. Underweight cartons, with crayon marks clearly visible, are separated in shipping room as they are taken from conveyor.

Cartons that pass the rigid weighing are palletized for pre-delivery storage and go out of the plant with a guarantee by Anheuser-Busch, Inc., that they contain 50-lb. plus of yeast.

You Get 8 Big Company Advantages When You Run—

And With Sessions for Your Supervisors

Regular get-togethers where foremen and executives face plant problems and weigh plant programs are "just what the doctor ordered" for top efficient, cooperative operation. Here's how to fill the prescription

ARTHUR C. CROFT
President, National Foremen's Institute, New London, Conn.

Results have thoroughly justified the efforts in those food plants where management has introduced a well thought-out plan for instruction and training of supervisory personnel, and where this instruction has enjoyed "follow-through" in all details.

Here are 8 outstanding benefits obtained by such training:

1. **Lowered cost of plant operations.**
2. **Reduction in leaks and waste.**
3. **Less employee tardiness and absenteeism.**
4. **A continuous flow of first-hand reports on actual conditions in the plant.**
5. **Improvements in union contract terms, better employee understanding of the same, and more satisfactory fulfillment of the agreement.**
6. **More efficient departmental cooperation with less friction between sections.**
7. **Increased value of supervisory personnel, which in time will justify advancement of some of the individuals to higher responsibilities.**
8. **Material aid in furthering the company's public relations program.**

Before discussing the scope and execution of a workable plan, a word of warning may well be offered on naming the project: Even though management classes this kind of undertaking under the head of instruction, nevertheless designations such as "training," "schooling," "course of study," etc., should not be employed. Instead, labels for such group activities might better be something like "Operation–Supervision and Cooperation", "Operation – Planned Efficiency", "Works Planning Committee", or "Production Steering Committee."

After completion of a number of well-organized meetings, most of the supervisory members generally admit –at least to themselves–how much they have learned as compared with how little they actually knew about the job function at the start. But had these individuals been bluntly told at the beginning, "You are to be taught, trained, schooled, their attitude likely would have been, "What do you mean, train me? Do you think I don't know my job?

Obviously, such reactions tend to defeat at least one of the purposes of the project–that is, the objective of building up each person in the supervisory personnel, to create a realization of the actual responsibility of the job function and the true importance of supervision in the company's overall plan.

Lube vs. Friction

This "feed-the-ego" build-up, if you will, relates each one to his department's function and his nitch in interdepartmental cooperation. Thus oriented, the supervisor serves better to "lubricate against friction" in human relations.

One more pre-planning caution: Management must take very seriously both the planning and the execution of the project, otherwise it is likely to fall flat. Obviously efficient execution of every management function is directly or indirectly affected by the efforts, or lack of them, on the part of the supervisory group. Therefore, not only should every function of management be represented in the actual development of the plan, but

also should be in evidence at all of the meetings.

Whether anticipated or not, two results may be expected when men from management take a part in the gatherings: Invariably, management itself learns and is "trained" as much, and sometimes more, than the supervisory group. Then, too, the importance of the meetings is emphasized by the presence of management, with the result that supervisors will take the meetings with full seriousness.

And usually, these informal meetings between management and the supervisory group help open channels of communication from top to bottom—from worker to president.

Represented at the meetings should be such management groups as purchasing, sales, engineering, laboratory, safety, and personnel, as well as top-executive. Not only do continued meetings between management and supervisory groups solve many irritating problems, but any idea on the part of the supervisors that management is "just a bunch of stuffed shirts" is quickly dispelled. And don't forget that the improved views and attitudes of supervisors generally penetrate the entire worker personnel.

If management assumes the premise that efficient performance of supervisory personnel is as vital to production as are sound administrative decisions of the board of directors, then the case is well supported for adequate representation of management at the meetings. It speaks for itself.

Choosing the Curricula

Now for planning the first series of meetings. If the scope is adequate and subjects sincerely presented, there will be no dearth of programs for the future. For many subjects for discussion will not depend on management selection, but will be instigated by vitally interested supervisors bent on improving over-all efficiency of "their plant".

The core of accomplishment lies in understanding. Before anyone achieves best results in any undertaking he must know exactly what he is to do and why. Therefore, objective of the initial meetings should be promotion of understanding. If, in the planning stage, management takes a "standoffish" attitude and indicates an unwillingness really to take down its hair, or hesitates to answer questions and provide full information—then call off the meetings with the supervisors. Little will be gained and time and effort will be wasted.

First meetings profitably may be devoted to a thorough investigation of company structure, in fact its anatomy. What are the bones of the corporate skeleton? What muscles make them work? How vital is the communication or nerve system? And why?

Though program continuity may be flexible, both in opening and following sessions, it is advisable to open up with at least a highlighting of the following subjects:

1. Discuss company products and how they are made. Though you may think that a step-by-step study is trite, remember that few supervisors are familiar with all operations and fewer know all the whys. This is the opportunity to stress the importance of sanitation, quality control, and coordination of department activities, with pertinent illustrations.

2. Review the equipment necessary to plant operations. The opportunity will arise to illustrate the company's investment to ease the labor of workers and at the same time advance the general level of employee income. You'll also find means here to drive home the cost of plant and machinery upkeep, repairs, and maintenance.

3. Company financial structure is a valuable subject for detailed explanation and discussion. Raw materials and supplies, power and fuel, should be covered, along with a comprehensive picture of quality standards established and how maintained. Costs involved are also in order for discussion. These may be presented both as actual costs and as expenditures relative to other financial outlays and investments.

You have a valuable occasion here to compare costs of labor with other costs. When the former are discussed, including fringe benefits, comparisons can be made with the average for the branch of the industry and also with other types of food processing (facts are available from U. S. Department of Labor, also State sources).

Insurance, presented both from the standpoint of protection for the company and for the worker, can be "brought alive" with interest, to erase disturbing misconceptions.

Rarely do workers or supervisors have a clear conception of the increasing cost of corporate taxes, or the proportion of the sales dollar that goes to the revenue collectors. Enlightenment, which can do no harm, should aid comprehension of company problems.

Laid on the Table

When the facts regarding dividends, reserves, and other necessary payments, are laid on the table, expressed as percentages of the sales dollar, as a cost per employee, and

(Turn to page 150)

CAREER ARTICLE

Will Help You Bring More Technical Men Into Your Plant

One of the serious problems faced by the food manufacturing and allied industries is a growing shortage of people with the right kind of technical training.

In this era of revolution in unit operations and processes, a dearth of technical know-how is a crippling brake on progress.

The best way to break loose from this anchor is to interest technically minded high school students in a professional career in our industry. And of course, they should be inspired to take courses in food engineering or food technology in college.

Spread the Message

You and others interested in progress in the industry can play a part. You can take steps to get information about the industry into the high schools in your area. And you can also bring it to the attention of your workers who have children of high-school age.

It is to help you to do your part that this article was prepared. It is addressed to students, so that you may use it directly to serve its purpose.

Top management, technical men, and personnel directors owe it to their industry to bring this type of information to the attention of students. Check with school officials in your city or town to determine the best way.

Hold a Meeting

You could, for example, invite technical teachers and their students to see your plant and attend a meeting in which you discuss the industry.

Reprints of this article may be purchased from FOOD ENGINEERING. Or you may make your own reprints if you prefer.

—THE EDITORS

REWARDING CAREERS AWAIT TECHNICAL MEN

In Food Industry

• Demand exceeds supply • Young men can ride engineering tidal wave • Will benefit from virgin status of big vital industry

FRANK K. LAWLER
Editor, "Food Engineering"

YOUR CAREER CHECK-LIST

For Quick Appraisal of Food Industry's Advantages

- Big Demand for Technical People
- Good Starting Pay
- Conditions Favorable to Progress
- Limited Technical Competition
- High Degree of Job Stability
- Work in Non-Seasonal Industry
- Interesting Technical Work
- More Than 30,000 Companies in Field
- Industry Top Spender for Improvements
- Great Engineering Advances Under Way
- Revolutionary Techniques Imminent
- Most Major Industry Advances Still Ahead
- Challenging Problems on Which to Work
- Chance to Get in on "Ground Floor"
- Industry Serves 160,000,000 People
- Products Vital to Consumers
- Industry More Depression-Proof Than Others
- Can Help Improve Public Health
- Work Contributes to National Wealth
- Opportunity to Work in Preferred Area
- Pleasant Working Environment
- Chance to Pioneer Great Developments
- Way Open to Top-Management Jobs
- Can Start Your Own Business
- Opportunity to Become a Consultant
- Profession Carries High Prestige
- Variety of Professional Activities
- Training Suited to Allied Industries
- Opportunity to Meet Many People on Job

Chance to Pick Preferred Type of Work:

- Process Development
- Equipment Design and Fabrication
- Plant Design and Construction
- Engineering Research
- Scientific Research
- Technical Sales and Service
- Purchasing Equipment and Supplies
- Teaching Your Profession
- Supervision and Management
- Product Quality Control
- Statistical Quality Control
- Sanitation and Pest Control
- Waste Disposal
- Product Development and Testing
- Packaging Engineering
- Instrumentation of Processes
- Materials Handling Engineering
- Heat Transfer
- Refrigeration and Air Conditioning
- Biological Processing
- Chemical Processing
- Horticulture and Agronomy
- Nutrition
- Maintenance
- Industrial Engineering
- Accident Prevention
- Employee Relations
- Public Relations

TURN PAGE FOR DISCUSSION→

STERILIZING is one of the basic food factory operations. Here food engineering students at Illinois Institute of Technology study application to canning.

CHECK THE ADVANTAGES

There's nothing better than a check-list to help you make an evaluation. And the score-sheet on the preceding page can be put to good use in sizing up the food manufacturing and processing industry as a place in which to build a successful and satisfying career.

Check the factors important to you. Likely you will be surprised at what the food field has to offer young technically trained men and women.

While many of the advantages in the check-list are self-evident, discussion of some of the most vital points may help you. This you will find in the various sections of this article.

DEMAND FOR TECHNICAL PEOPLE

Now in the middle of an engineering revolution, the biggest, oldest, and most stable industry of them all—food manufacturing—needs help, your help. It is seriously short of properly trained technical manpower.

Food Engineering is a new profession. While thousands are engaged in food engineering work, only a handful hold degrees in that branch of engineering. Even people with degrees in Food Technology are relatively few in number.

As a result, several thousand food engineers are needed —and urgently—to serve the food and allied industries. No other field is so short of engineers. And the salaries of recent food engineering graduates exceed the average for the engineering professions for which comparable data are available.

In the past year, a mere 250 students technically equipped for our industry were graduated from colleges and universities. And of the handful of food engineers coming out of school, each was sought by seven or eight companies.

WHAT IS FOOD ENGINEERING?

You perhaps have heard little about food engineering, though you are familiar with chemical, mechanical, electrical, civil, and industrial engineering.

Food engineering teams engineering know-how with knowledge of the food sciences, such as bacteriology and chemistry. It might be defined as a combination of mechanical engineering and the biological sciences. Or think of it as the food equivalent of chemical engineering.

Many food companies have paired mechanical engineers with food technologists or food scientists to form teams capable of doing the work of food engineers. Several have hired chemical engineers.

But the ideal is an individual who has in one head the combination of know-how required for food work.

WHAT A FOOD ENGINEER DOES

This new professional technical man of whom we speak leads an interesting and challenging technical life. Food engineers design new food plant equipment and processes, install them, operate them. They design food factories to make them meet their special requirements of sanitation, easy cleaning, and suitability to the processes involved. They develop food packages which protect the product and

lend themselves to efficient filling and handling, and they engineer production lines to fill, seal, and case these packages at high speed.

To put it briefly, the food engineer puts food science to work on an economical commercial basis to produce quality and convenient foods at reasonable prices so as to raise the standard of living in the world. He indeed, is removing much of the cooking drudgery from the kitchen. And eventually he practically will have taken the homemaker out of her kitchen and freed her for other activities, increased her leisure, and lengthened her life.

This food engineer also is improving the nutritional quality of food to make you and me healthier, to keep us alive longer.

Finally he is helping the farmer by putting his crops into marketable form at lower cost and developing useful byproducts from waste agricultural materials. All this puts more money in the farmer's pocketbook while keeping the cost of everyone's food bill relatively lower.

You really have to take your hat off to a professional man who does so much good for so many. And you may be assured that his work not only is interesting and varied, but he derives great satisfaction from it. He has a lot of self-respect. And he commands respect from others.

All the while he makes a good living. And he has a good future ahead of him.

What more can a professional career offer?

TYPES OF POSITIONS AVAILABLE

You name the particular phase of technical work which appeals to you most, and you're pretty sure to find such work available in the food manufacturing and allied industries.

Technical men are doing important work in fundamental and applied research, pilot-plant operation, quality control, sanitation, manufacturing operations, packaging, shipping, equipment design and application, safety, industrial engineering, management—even crop production and meteorology.

As a matter of fact, the average technical man in a food company is concerned with many different phases of the technical and management operations. So his work is unusually varied and interesting. His is not a monotonous life.

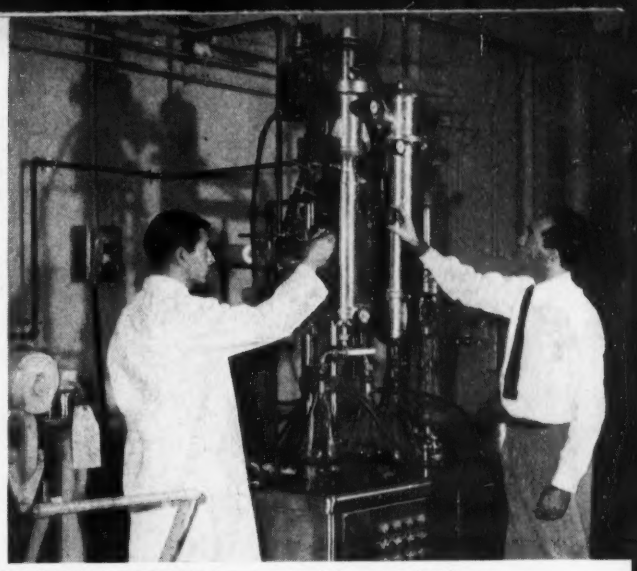
And here's an important advantage the technical man has in the food field. He has more technical responsibility and authority than his counterpart in most other industries. The reason: He often will be either alone—or one among a few—as a technical expert in the plant in which he works.

YOU GET IN ON GROUND FLOOR

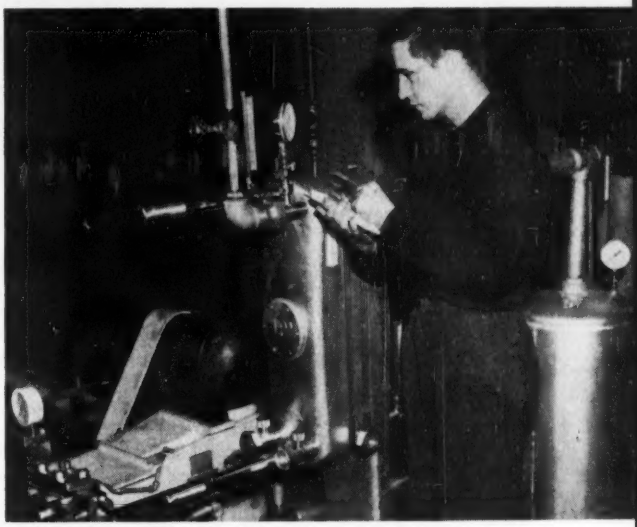
Not only is the food manufacturing business growing nicely toward a tremendous future, but it now is in the early stages of technical upsurge. Food engineering is revolutionizing food manufacturing methods. And leaders in the field say, "You haven't seen anything yet!"

This means that the great food industry is, in a career sense, almost a new industry for the technically trained man. It is practically virgin territory. So capable young people entering the industry in a technical capacity are in on the "ground floor." They can ride upward in their career on the technical upsurge, the "tidal wave" of food engineering.

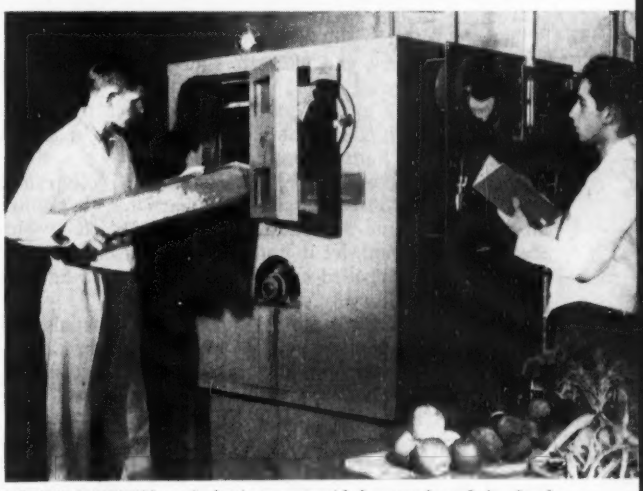
Any old timer will tell you that its much easier and more rewarding to progress with an industrial tide than to try to fight your way forward when there is no helping current.



MOISTURE REMOVAL is involved in many food processes. So these food technology students at Massachusetts Institute of Technology operate a turbofilm evaporator as part of training.



HEAT EXCHANGE, important in every type of food plant, engages attention of food-engineer-to-be.



DEHYDRATION and drying are widely employed in food industry. These food engineering students are acquiring that know-how.

TOMORROW'S FACTORY—3D model of most modern, $10 million biscuit bakery being built by National Biscuit on outskirts of Philadelphia. More technical men are urgently needed to carry out modernization in food industry.

WHAT THE FOOD INDUSTRY IS LIKE

Food manufacturing and processing is a key link in the lifeline of America. It takes products from the farm and puts them into marketable form so that they may be shipped to points of consumption or stored in warehouses to make them available the year around in top-qualtiy condition.

Without this service, America as we know it today would not exist. Our tremendous urban centers of business and industry would have no food supply. They could not get by on products produced locally in their area's growing season.

Food manufacturers take raw food materials, preserve them, put them into more edible forms, and combine them to make different kinds of tasty, nutritious, and convenient foods. An important part of this operation, of course, is packaging the products to preserve them, keep them sanitary, and facilitate wide-spread distribution and self-service retail sales.

And here, in a general sense, is what takes place in a food factory when edible, more or less perishable, materials are prepared for human consumption:

Food manufacturers take materials apart, clean and grade them, put materials and ingredients together, form the product to the desired size and shape, treat it with heat or refrigeration, let it undergo chemical or biological change under controlled conditions, and put the finished product into technically proper packages.

All the while, the plant is moving the materials and ingredients from point to point in plant and process, maintaining a sanitary environment, determining and checking quality characteristics, and controlling temperature, time, pressure, pH, and other variable factors.

By the very nature of these operations and the raw materials involved, the various branches of the food industry are on common technical ground. In other words, fundamental food engineering and technology are involved in the operations of a bakery, just as in a cannery—in a meat plant, as in a cereal factory—in a brewery or beverage bottling plant, as in a dairy.

Here are some of the most common operations and processes:

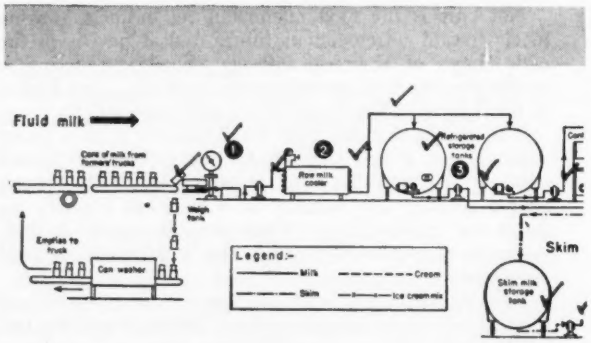
Quality control, sanitation, materials handling, automatic control, packaging, heat transfer, moisture removal, refrigeration, air conditioning, waste disposal, separation, washing and peeling, size reduction, mixing, forming, coating, sterilizing, fermentation, pickling, and smoking.

RESEARCH AND DEVELOPMENT

But factory operations are by no means the only occupation of technical people in the food industry.

Many food companies, equipment and supply firms,

TYPICAL PROCESS—This flowsheet of milk and milk products lines exemplifies operations in modern food factory. Colored checkmarks indicate things common to other types of food plants. Obviously, a food engineer or technologist is at home in any branch of the industry.



and industry associations operate laboratories. In these, new products, packages, machines, and processes are developed and tested by technically trained personnel.

Then these developments, after pilot plant testing, are converted to commercial application. One of the food engineer's greatest responsibilities is to convert the developments of the laboratory into successful and profitable commercial-scale factory production.

ALLIED INDUSTRIES

As a great industrial operation, food manufacturing is served by thousands of companies which develop and manufacture equipment, supplies, processed ingredients, and materials.

These enterprises, too, need personnel trained in food engineering and the food sciences. Many of them even require technical sales people to introduce their products and show the food manufacturer how to use them.

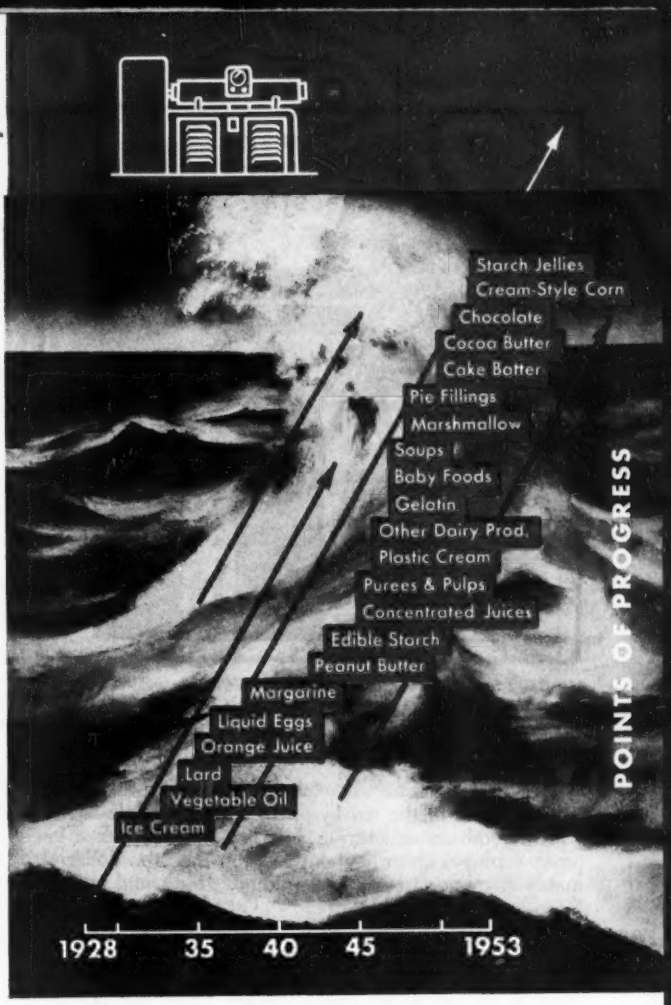
So the professional opportunities of the food engineer and technologist extend far beyond the broad horizons of the huge food manufacturing business itself.

One container research and development operation, for example, employs over 200 technically trained people, including food engineers, technologists, chemists, bacteriologists, and physicists.

Municipal, state and federal agencies and laboratories concerned with the food field in a regulatory or research capacity offer employment for hundreds of people trained in the technical aspects of food production, manufacturing, and distribution. Finally, many industry associations require food engineers and technologists.

Yes, the food field involves a huge, widespread area of technical operations.

Yet it is a relatively virgin field for those trained to cope with its technical problems and contribute to its progress.



TIDAL WAVE of progress, showing how advanced operation—heat exchange with continuous rotary-scraper unit—has spread through the industry. Note post-war upsurge. Other unit operations show similar upsurge. Young technical men can ride tidal wave of engineering to success.

IT'S A GREAT BIG GROWING INDUSTRY

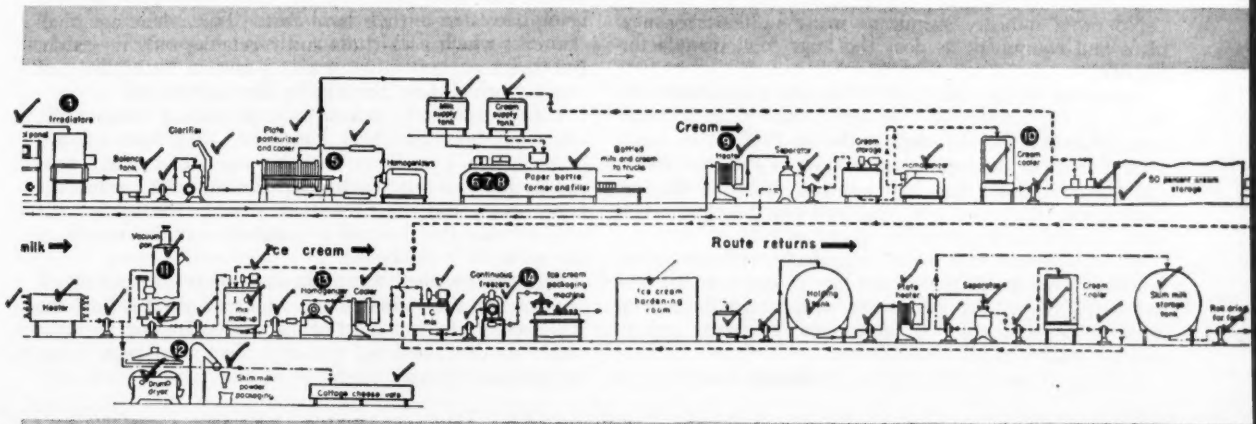
Food is a 67 billion dollar industry, measured by annual retail sales. A high and ever-increasing percentage of this total is processed and packaged food. Between 1929 and 1950, food manufacturers sales increased 234%.

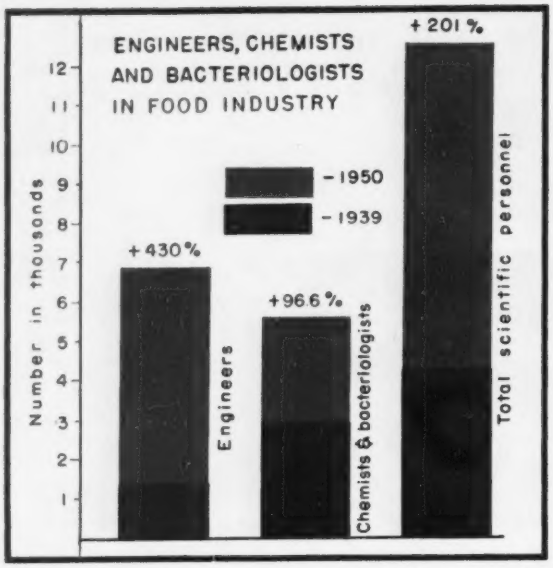
And at the present time, the industry is rolling ahead at an unprecedented rate. In fact, it is enjoying a bright new phase of consumer acceptance—a skyrocketing market for "convenience" items, such as prepared mixes, instant coffee, and frozen concentrated juices. And this situation is creating new opportunities for food manufacturers.

No less than 33.2% of expenditures for consumer goods and services went for food in 1951, compared to 25.1% in 1929. Among those in the income brackets beyond $4,000, spending for food jumped some 60% in the past half-dozen years.

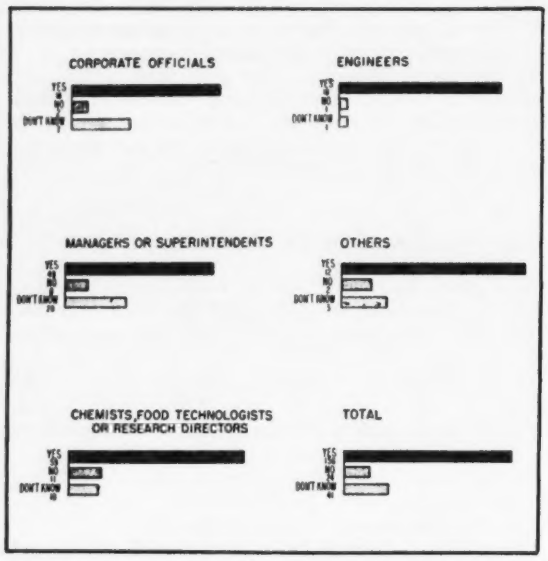
By comparison with the food industry, the steel, automobile and other "greats" really are "lesser operations."

Furthermore, food manufacturing is the most stable, depression-free industry of them all. People eat three times a day, year in and year out. As a result, the food manufacturing industry as a whole has made a profit each and every year—even during the bleak business days of





MORE TECHNICAL personnel have come into the industry in recent years. Yet the need for them now exceeds supply by many thousand.



"DOES YOUR JOB involve Food Engineering?" "Yes," say most people in responsible positions in our industry, as this chart shows.

1932. At that time all manufacturing industries taken together were in the red by nearly 5¢ on the sales dollar.

The food manufacturing industry operates on a low profit margin—currently about 2.4¢ on the sales dollar. It makes its money from a high-volume, steady, and essential business.

This low-profit margin, incidentally, is one of the reasons the industry needs more technically trained people. It must keep improving the efficiency of its operations as costs of raw materials, supplies, labor, taxes, and shipping rise.

And it has been doing a very commendable job in this respect.

As measured by numbers of plants, the food manufacturing business is tremendous. Although food factories have been decreasing in number as they become larger and more efficient, there are more than 30,000 of them. Furthermore, they are scattered all over the country.

So this offers young technical people coming into the industry the rare opportunity to locate in that part of the country in which they would like to live. And later in their career, it permits them to change employers or to move to a different part of the country.

IT SPENDS IN BIG WAY FOR PROGRESS

No other industry spends as many millions for new plant and equipment as does the huge food manufacturing field.

According to the last study of capital expenditures by the U. S. Department of Commerce, more than 800 million dollars was the industry's outlay in 1947. This was a little more than the capital expenditure of the great chemical industry, more than half again as much as the machinery manufacturing field, and well over two and a half times as much as the metal products industry.

In more recent years, food manufacturers have put as much as a billion dollars on the line in one year for new and better plants and equipment with which to step up capacity and efficiency, to make new products, and to improve quality of all its products.

Nothing is more satisfying to a technical man than to work in an industry which invests heavily in the new and better facilities which he recommends.

And it is also important to young people planning a career in the food field to know that the amount of money invested per plant worker will increase considerably in the next ten years.

TREND TO MULTI-PRODUCTS FIRMS

To broaden their base of operations, progressive companies in various branches of the industry have been adding different types of products to their lines. This makes them food companies in a broad sense, rather than, say, dairy firms.

This, too, is important to people picking the industry for a technical career. It widens their scope of operations and therefore requires broader technical knowledge.

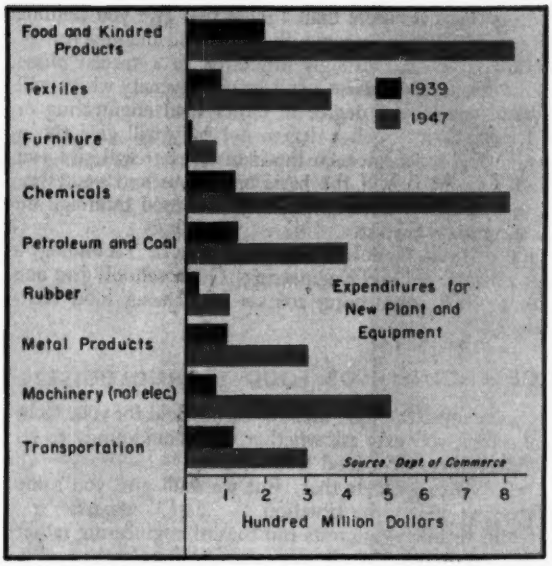
This trend favors food engineers and food technologists, rather than people who specialize on one type of food product or operation.

TECHNICAL WORK NOT SEASONAL

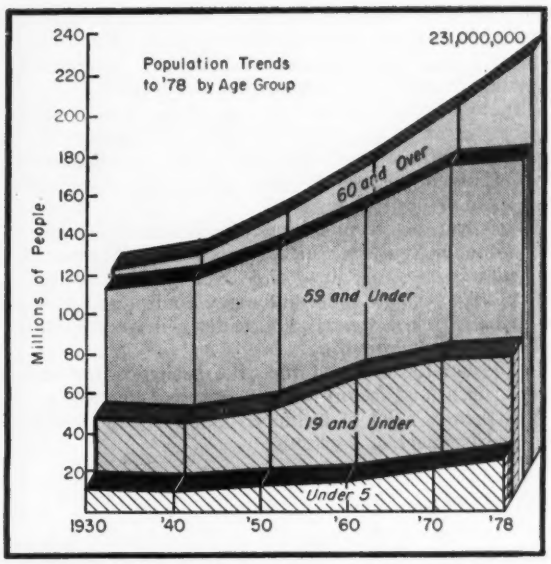
If you know little about the food industry, you may assume that food plants operate only when the crops are being harvested in their local areas. True, there are small canneries which pack fruits and vegetables only in season. But larger canners and preservers have a multiplicity of products which keep them going the year around.

Other food plants, such as those producing bottled milk, ice cream, beverages, beer, and meat, often have seasonal peaks in their operations. But they operate at a high level year in and year out. Factories producing such products as flour, bread, and cereals operate steadily throughout the year because the demand is constant and the supply of raw materials is stockpiled.

But whether there are peaks and valleys in plant operations or not, the technical man in a food plant is busy the year around. In fact most of his production-line improvements are developed and put into effect at off-peak times, for obvious reasons.



MOST PROGRESS $$—Food manufacturers spend more for new plant and equipment to improve efficiency than other industries. Technical men develop improvements.



GOOD FUTURE—Steady, long-time growth of food industry is assured by population increase of 71 million by 1978. Manufactured foods will gain faster than population.

BIG FUTURE FOR THE INDUSTRY

Some industries go strong today—but slowly go downhill tomorrow.

Not so with food manufacturing. Its strength increases as the years go by. Some 7,000 new food consumers sit down to the dinner table each day. And by 1978, there will be 231 million mouths to feed—an increase of 71 million over today's population.

But that's by no means the whole story. Manufactured and processed foods are steadily cutting into the fresh food business—thanks to product improvement, new convenience items, and cost reduction.

And the combined effect of these factors points to great gains in the sale of manufactured foods—to 100 or 125 billion dollars by 1978!

FOOD FACTORY OF THE FUTURE

Today's technical trends in food manufacturing point to a food plant of the future which will be a highly mechanized creation of food engineers.

Stretching parallel across a great expanse of sanitary floor space—between receiving and shipping platforms—will be continuous and automatic process, materials handling, and packaging lines.

Bulk ingredients will be automatically proportioned into the lines where required in the formulation of the product. These will be continuously mixed with other ingredients, then continuously processed. With no change of pace, the finished product will feed into packaging lines operating at tremendous speeds of 1,000 or more consumer-size units a minute.

Packaging materials will feed from bulk rolls into the packaging end of the line through automatic machines that form the containers and supply them at a rate synchronized with the speed of processing.

Directing the entire processing operations of the food plant of tomorrow will be a high-caliber technical man, probably a food engineer graduated from college in the next few years.

This master-mind will be stationed in a glass-paneled control room above the production lines and overlooking the entire production area.

Before him in his tower will be a battery of instruments, signal lights, and alarms mounted on graphic panel boards. Every key process factor will be indicated and recorded by the instruments, and any deviation from proper performance and product quality will be revealed immediately by the automatic detectors.

Television receivers, too, will be mounted in front of the process director. Wired to cameras at points in the process requiring observation, the industrial TV screens will enable the director to watch for such emergencies as jam-ups in automatic feeds, off-color product discharging from an oven, and so forth.

Two-way radio communication will be installed in the control tower, too. This will enable the process director to call maintenance crews and direct their work, order lift-truck operators to points where needed, and direct replenishment of dwindling supplies. In a big canning operation, he will direct harvesting and hauling operations to keep his plant running at maximum capacity or to avoid pileups at the receiving docks.

There is nothing in this concept of the food plant of the future which does not exist today, scattered piecemeal through many branches of the food and other industries.

And it points up the type of technical achievement in which you will participate if you pick the food industry for your career.

TECHNICAL ADVENTURE AHEAD

Tidal waves of technical progress are running through the food industry, swept along by fast-paced improvement in operations and processes.

This alone will make the life of future food engineers interesting, exciting at times, and all the while rewarding.

But more than that, the technical adventure in the field involves the investigation, development, and application of cold sterilization, ultrasonics, and a host of new in-stream quality control techniques.

Atomic energy may be involved in cold sterilization. That is, microorganisms in food may be killed by rays

from one of the radioactive materials, such as cobalt 60.

Or the lethal radiation may take the form of X-rays or electron beams from cathode ray machines, electrostatic generators, resonant transformers, or Capacitrons.

Ultrasonic waves may be utilized to mix, homogenize, disperse, extract, precipitate, sterilize, or measure food ingredients and products. Ultrasonic generators already are used in breweries abroad to obtain greater extraction from hops in brew kettles.

To control quality in process, developments are going far beyond instruments which regulate such variables, as temperature, pressure, flow, and level. Acidity, density, and crystal state are under automatic control. And even such more subtle factors as color, texture, blend—even odor and taste—will be robotized.

In the not too distant future, the quality-control technologist in a food factory will be a process engineer.

Yes, there is a lot of technical "romance" in store for the food engineer of the future.

HOW YOU TRAIN FOR THIS INDUSTRY

If your interests lie along technical lines, and you have done well with technical subjects in high school, then you apparently are the type of individual who could prepare himself for a rewarding technical career in the food manufacturing field.

Of course, you must have taken the subjects which qualify you for admittance to a technical college or university. High-school faculty advisors can tell you pretty much what credits you need. And a letter to the Registrar's Office of any school will bring you a booklet setting forth entrance requirements and listing courses you will take to attain a particular degree from that school.

But what colleges and universities train you to be a food engineer or food technologist?

Well, there are more than a score that give you training leading to a degree in some phase of food manufacturing. But unless you are strongly interested in a special phase of food science, we advise a college or university which will graduate you with a degree in either food engineering or food technology. Such a degree not only will give you a broader base for a career in the industry, but will give you a better knowledge of the basic operations and processes.

For names of schools giving technical food training, see the accompanying list.

One of these schools—Illinois Institute of Technology—gives a degree in Food Engineering. Other schools give one or more food engineering courses in training food technologists.

FOOD ENGINEER OR FOOD TECHNOLOGIST?

If you choose the food manufacturing field for your technical career, you may ask whether you should study to be a food engineer or a food technologist.

Only you can decide that. But we shall give you some pointers, as we see the situation.

If your technical interests run toward engineering rather than science—then by all means study food engineering.

If you prefer science to engineering, then food technology is the course for you.

Both the food engineer and the food technologist are trained to serve the food industry in a practical, rather than a purely theoretical, sense. But the average food technology curriculum will give you less engineering and more of the food sciences than will the food engineering course.

Either one you choose can bring you a rewarding career in the food manufacturing field. But there is little doubt that the food engineer will be better equipped to improve factory operations and cut costs. And such achievements are most highly regarded by top management.

THESE SCHOOLS TEACH FOOD ENGINEERING OR TECHNOLOGY

A. & M. College of Texas, College Station, Tex.—Dept. of Dairy Husbandry
Bucknell University, Lewisburg, Pa.—Dept. of Biology
College of the Pacific, Stockton, Calif.—Food Processors Dept.
Cornell University, Ithaca, N. Y.—School of Nutrition
Illinois Institute of Technology, Chicago, Ill.—Dept. of Food Engineering
Iowa State College, Ames, Iowa—Dept. of Bacteriology
Mass. Institute of Technology, Cambridge, Mass.—Dept. of Food Technology
Michigan State College, East Lansing, Mich—Dept. of Food Technology
Ohio State University, Columbus, Ohio—Dept. of Food Technology & Nutrition
Oregon State College, Corvallis, Ore.—Dept. of Food Technology
Purdue University, Lafayette, Ind.—Horticulture Dept.
Rutgers University, New Brunswick, N. J.—Dept. of Food Technology
State College of Washington, Pullman, Wash.—Dept. of Horticulture
University of California, Davis, Calif.—Dept. of Food Technology
University of Georgia, Athens, Ga.—Dept. of Food Technology
University of Illinois, Urbana, Ill.—Dept. of Food Technology
University of Maryland, College Park, Md.—Dept. of Food Technology
University of Massachusetts, Amherst, Mass.—Dept. of Food Technology
University of Miami, South Miami, Fla.—Dept. of Food Technology
University of Minnesota, St. Paul, Minn.—Dept. of Agri. Biochemistry
University of Washington, Seattle, Wash.—Dept. of Food Technology
University of Wisconsin, Madison, Wis.—Dept. of Dairy & Food Ind.

DUMP-BODY trailer raised for loading granulated sugar at American Sugar Refining Co.'s Baltimore plant. Note protected chute.

★ **Bags "Out"**
★ **Fewer Handlings**
★ **Less Labor**
★ **Lower Prices**
★ **Reduced Losses**

Are 5 Benefits Credited To—

Bulk Sugar by Trailer

FOR THE PAST 15 years, The American Sugar Refining Co., a pioneer in the bulk delivery of granulated sugar, has been passing on to food processors notable savings achieved by doing away with the old method of supplying sugar in 100-lb. bags.

While expenses of actual delivery itself are much the same by bulk or bag, the refiner's cost of container, packing expense, and manual handling are either completely eliminated or greatly reduced in the bulk system.

These economies go to the food processor in the form of lower prices. And the processor makes further savings once he has equipped his plant with bulk storage bins and bulk handling equipment for receiving sugar from automotive units and moving it into process.

These savings include more efficient use of storage space; reduced in-plant handling costs; elimination of the labor of unloading, stacking, rehandling, and transporting from storage to production, as well as the manual dumping of the sugar bags. There is also a reduced loss of sugar during storage. And the oldest stock is used first.

No substantial changes in the Domino sugar refining process, such as aerating to remove traces of moisture clinging to the crystals as they emerge from the refining machines, were reported necessary in bulk deliveries. Clean, dry sugar should, of course, always be supplied.

At the present time the refiner's bulk sugar is delivered in commercial zones in Boston, New York City, Philadelphia, and Baltimore by means of nine tractor-trailer units.

Hauling a payload of approximately 21,000 lb. (10½ tons) each carrier consists of a single-rear-axle tractor and a single-axle semi-trailer with a tank type body.

Tracing the Development

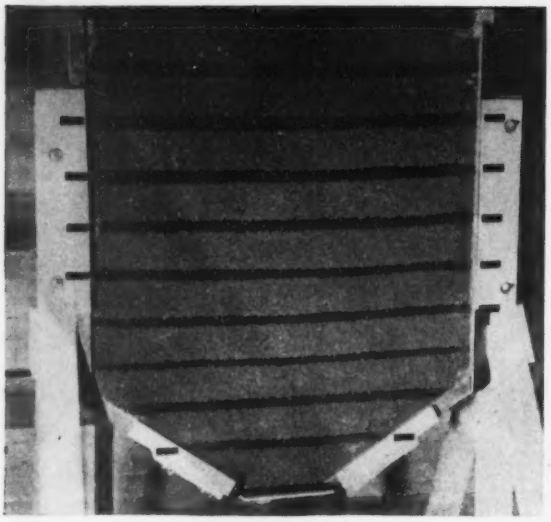
This equipment is an outgrowth of delivery experience dating back to the company's earlier bulk-truck program started in 1939. At that time, in cooperation with the New England Confectionery Co. in Boston, the company began operation of a straight truck with a closed-bin type of body which had a screw conveyor in a trough in the bottom for unloading. A similar unit was placed in operation in New York City in 1940.

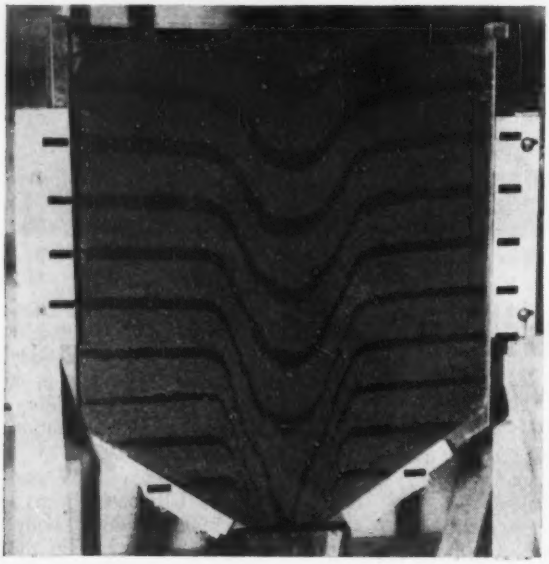
In the years between 1939 and 1954, the trend has been from a straight truck with stationary body, unloaded by a screw conveyor in the bottom, to the present tractor-trailer unit with body raised by a vertical mechanical hoist. Latter may be carried inside a recess in the front end of body (see illustrations), and it utilizes gravity to unload the sugar from the rear.

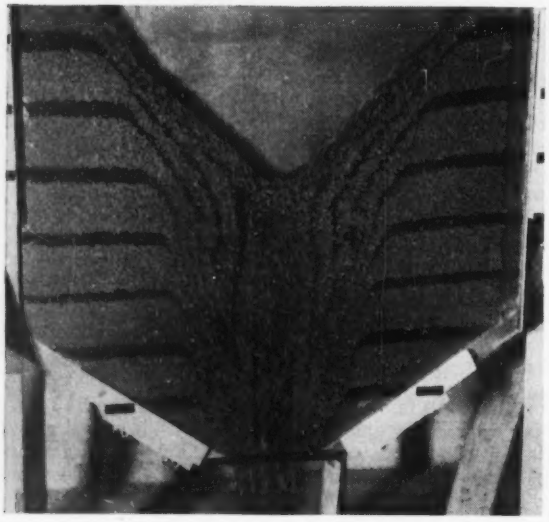
The trailer dump bodies have proved easier to clean and maintain than the old non-elevating bodies unloaded by conveyors. There is also some increase in the ease of discharge with the dump body. And the company states that there has been no problem of excessive caking of the sugar in transit.

The unladen weight of each of the latest combinations is 25,000 lb.—12,000 lb. for the tractor and 13,000 lb. for the trailer. With a legal gross weight limit of 46,000 lb. in the areas involved, this permits the payload of 21,000 lb. (Turn to page 136)

Free Flowing▼







How Materials

Findings take guesswork out of design

JOHN K. RUDD

Chief Research Engineer, Richardson Scale Co., Clifton, N. J.

Today there is no need for guesswork in the design of a solids-material bin. How a particular material will flow from the bin can be determined mathematically.

Thus, recent findings made at our laboratory are placing solids-flow on a scientific basis.

Forces governing the flow of solids in bins, chutes, and hoppers may be accurately measured. And equations for solids flow may be drawn up. These equations would be analogues of the equations for liquid flow. Thus, a process engineer should eventually be able to design and specify bins, feeders, or conveyors as precisely as he does tanks, pumps, or fittings.

As a result of the past year's investigations on the nature of solids flow conducted at our laboratory, we have also found the following.

1. There are fewer factors determining flow than was generally thought. Key ones for the hopper are: Head, diameter, slope angle of sides, and diameter of discharge opening. For the material they are: Coefficient of friction, ratio of lateral to vertical pressure, specific weight, and shear strength. Temperature and moisture content may be indirectly accounted for or overlooked *if* the sample tested is representative of process material.
2. To start flow of solids in a bin, you need only consider the forces acting on a central column of material extending up from the discharge opening.
3. Material flowing from a confined area should be classified as either cohesive or non-cohesive. Flow for the two classes is so different that the question is best attacked as two different problems.
4. There exists a minimum discharge opening for any given cohesive material in any given hopper or bin.

How Findings Were Made

While finer knowledge of materials flow would help our engineers improve materials handling equipment, management also believes a better understanding will enable us to build faster and more accurate weighing equipment.

So far, three investigations have been made and completed at the laboratory. They include:

1. *Measurements of pressure created by a head of material in straight and slope-sided hoppers.* These tests were made primarily to check Jannssen's equation for pressure in circular, straight-sided hoppers, and to see how far the equation applied to slope-sided hoppers.
2. *Investigation of lateral and vertical pressures created by materials in different bin configurations.* Lateral and vertical pressures, under a given head of liquid, are always

FLOW PATTERN of non-cohesive materials is shown in three successive stages. Lines are thin layers of darker-colored material for purpose of observation. Top left: Material prior to discharge. Center: Immediately after opening of discharge gate—only material over gate is flowing. Left: Flow is taking place largely in central column, with upper surface running into it. In this case, angles of slide and repose differ.

Flow From a Bin

and put solids flow on scientific basis

equal. This is not true for solids because of friction between adjacent particles of material and cohesion of particles.

3. *Investigation of the mechanics of flow.* How do various materials behave when they flow from a bin? Are there any consistent patterns of flow? What effect has the geometry of the bin on discharge? What happens when material is removed from the bin while the bin is being fed? These are a few of the problems that we of the research staff tried to solve.

Available Data Limited

Little has been published in the field of solids flow. There have been some experiments conducted in soil mechanics. However, these studies are not generally applicable to investigation of solids flow in confined areas.

Pertinent research, though, was done by Jannssen and Airy. Both men have evolved equations for pressure exerted by material in straight-sided bins and hoppers. They are as follows:

Jannssen's Equation:

$$P_v = \frac{\omega R}{K\mu^1}\left[1 - e^{-\frac{K\mu^1 h}{R}}\right]$$

P_v = pressure on base (lb. per sq. ft)
R = hydraulic radius (ft.)
K = ratio of lateral to vertical pressures in bin
μ^1 = coefficient of friction of material against bin wall
h = height of material in bin above base (ft.)
ω = specific weight of material (lb. per cu. ft)

Airy's Equation:

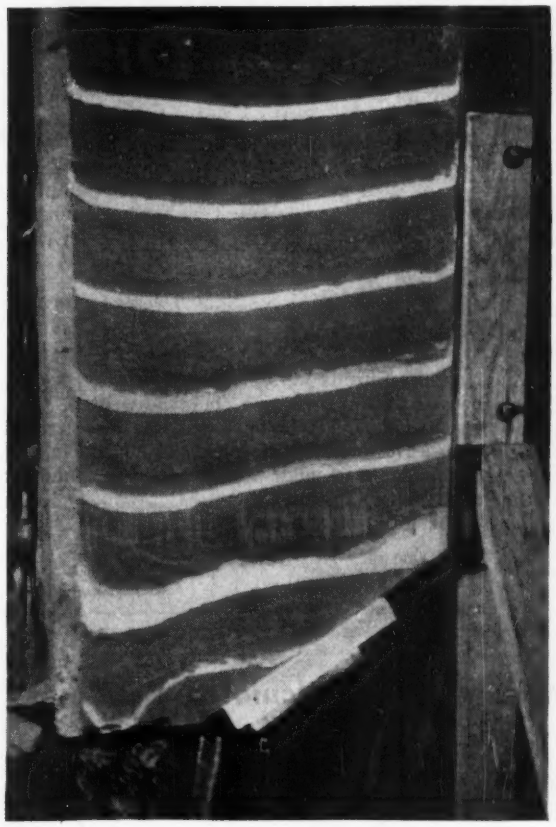
$$P_v = \frac{\omega D}{K(\mu + \mu^1)}\left[1 - \frac{\sqrt{1+\mu^2}}{\sqrt{\frac{2h}{D}(\mu+\mu^1) + 1 - \mu\mu^1}}\right]$$

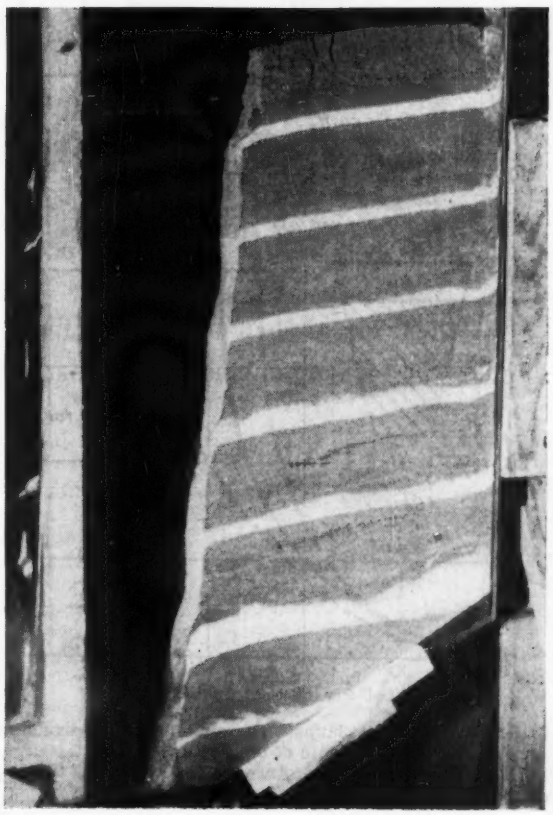
D = discharge diameter
μ^1 = coefficient of friction — material against bin wall
μ = coefficient of friction — material against material

First step in the investigation consisted of setting up experiments to check Jannssen's equation. We chose Jannssen's instead of Airy's because the basis underlying it seemed fundamentally more sound. At the same time, it is much simpler to work. These assumptions, as experimental results indicated, were justified.

Test No. 1

To check Jannssen's equation, we built a series of small hoppers—a straight-sided hopper and others having 5 and 20 deg. slopes from the vertical. A hydraulic cell was placed under the hopper at the discharge opening. Tests were run using ⅛ in. polystyrene granules, Portland cement,





WHAT HAPPENS with cohesive materials is illustrated in two photos on right. Lines here are lighter-colored material. Top right: Material before discharge. Right: Immediately after central column moved out. It left as a plug, leaving "rat hole" (left). Rapping was required to move the rest. Tests indicated that key design feature governing flow was size of discharge opening in relation to proportions of rest of bin.

and dry mash feed. Pressures on the full discharge opening were determined for known heads in the hopper.

Results of the tests with the circular, straight-sided hopper checked with theoretical values obtained from Jannssen's equation. But they also indicated that this equation did not apply for slope-sided hoppers.

Our principal interest in these and subsequent investigations was in the hard-to-handle materials. There is no real problem in handling dry free-flowing materials. However, we investigated non-cohesive materials to permit us to make comparisons, and to see if an understanding of non-cohesive materials would lead to a better understanding of the cohesive solids.

Test No. 2

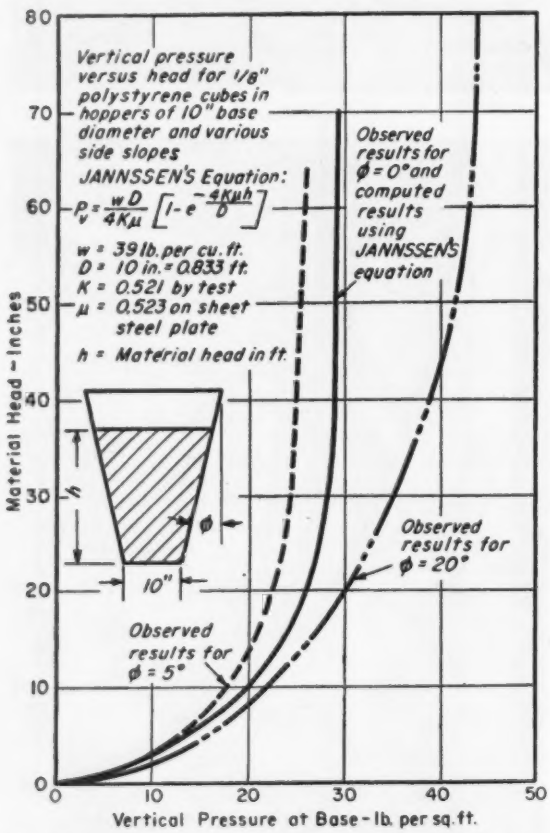
After preliminary tests were concluded, we felt a more general equation than Jannssen's could be written. This new equation would apply to slope-sided as well as straight-sided hoppers. However, first K (ratio of lateral to vertical pressure of the confined solid) would have to be found for the materials undergoing test.

K has a theoretical basis as shown by Rankine:

$$K = \frac{1 - \sin \alpha}{1 + \sin \alpha}$$

α = angle of repose

Observed vs. Calculated Results


Vertical pressure versus head for 1/8" polystyrene cubes in hoppers of 10" base diameter and various side slopes
JANNSSEN'S Equation:
$P_v = \frac{wD}{4K\mu}\left[1 - e^{-\frac{4K\mu h}{D}}\right]$
w = 39 lb. per cu. ft.
D = 10 in. = 0.833 ft.
K = 0.521 by test
μ = 0.523 on sheet steel plate
h = Material head in ft.
Observed results for ϕ = 0° and computed results using JANNSSEN'S equation
Observed results for ϕ = 20°
Observed results for ϕ = 5°
10"
h
ϕ
Material Head - Inches
Vertical Pressure at Base - lb. per sq. ft.
0
10
20
30
40
50
60
70
80

CURVES show that Jannssen's equation for determining pressure on discharge gate of bin holds true only for circular, straight-sided hoppers. An equation applicable to both straight and slope-sides is being evolved.

However, this applies only for materials in an unconfined condition. To date, only a few values of K for confined materials have been determined and published, along with those by Jannssen for dry grains.

To get values for K we had to design a testing machine and run our own determinations. The device, which we called a K-determinator, consists of a tank into which is placed a cylinder whose walls are made of extremely thin flexible rubber and whose ends are comprised of rigid material.

A sample of material is placed in the cylinder and the cylinder installed in the tank. A given pressure is then established inside the tank, creating a known lateral pressure on the sample. A vertical pressure then is applied by a piston on top of the cylindrical sample.

Vertical pressure is increased until the rubber walls start to give way. At this point, the vertical and lateral components have been determined. Thus, P_l/P_v equals K.

We have found that K varies with height of material in the hopper and the diameter of the hopper. Therefore, in determining K, we choose the height-to-diameter ratio of the test cylinder to comply with the hopper configuration under investigation.

Right now, with the values of K determined, we are able to check test results with theoretical figures, and to chart test and theoretical curves (see chart). From this data, our engineers are confident that a general equation can be evolved.

Test No. 3—Flow In Bins

To study flow inside bins, a bin cross-section was built with a plate-glass front, metal back, and adjustable discharge opening, and tapering lower sides.

Using cohesive and non-cohesive materials, we made several studies of flow behavior with several bin configurations. For close observations, slow motion pictures were taken of the flow of material from the bin.

Results of these tests indicate the following:

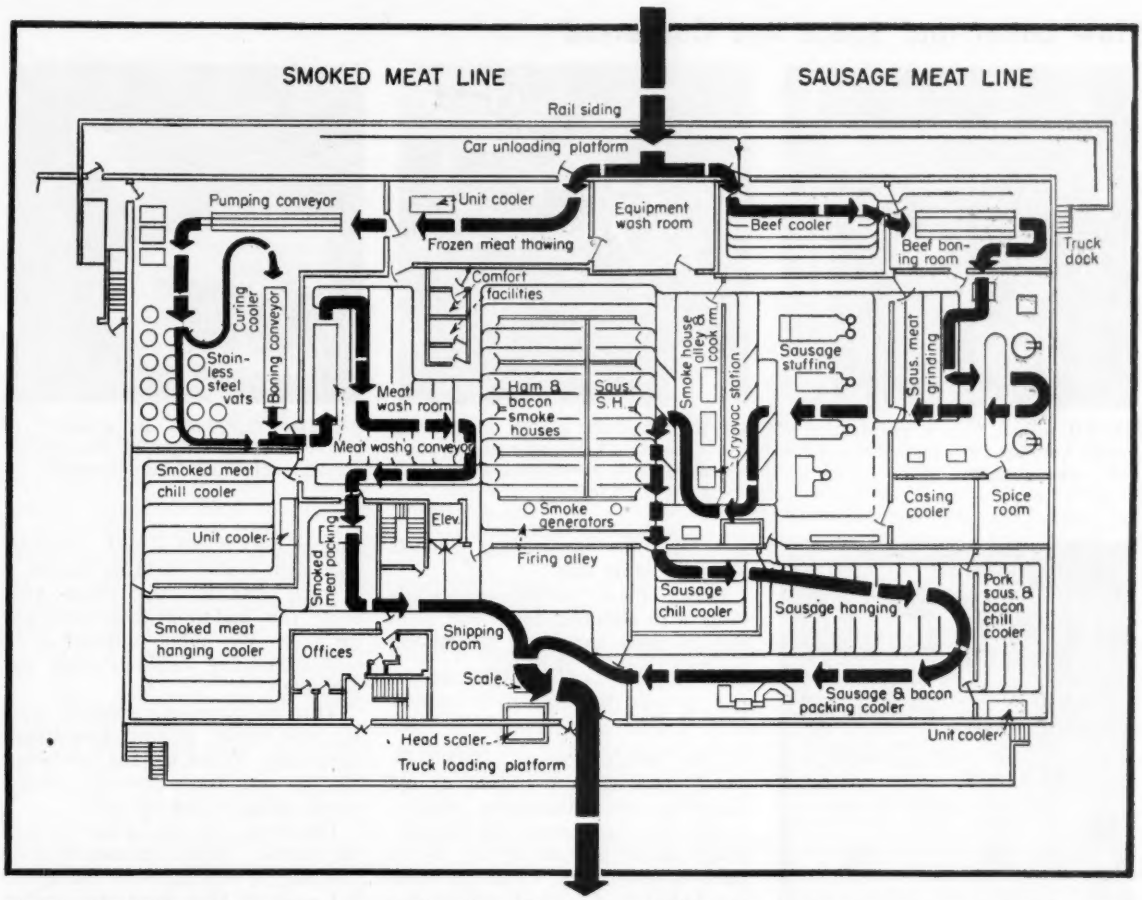
1. A central column of flow exists above the discharge opening and is as wide as the opening. If material was being put into the bin at the same rate as it was being withdrawn, material outside the area of the central column consequently would remain static.
2. Material flows into the central column area as soon as the central column is discharged (see lead illustrations on left).
3. With cohesive materials, a central "plug" moves out when the discharge gate is opened, and may leave a rat hole (lead illustrations, right). To get further flow in this case requires rapping or hammering on the bin.

Yet To Be Done

Flow, we believe, occurs when a stress is set up that overcomes the shear strength of the material. It is possible to find the shear strength for a material in any bin configuration. We have designed apparatus that will permit us to determine it by measuring the force required to make a known plug of material shear against surrounding material.

Stress depends on the characteristics of a material and on the design of the bin. It can be determined as soon as a reliable equation has been evolved. When we know both stress and shear strength, we will be table to predict conditions governing flow in a given process.

To confirm theoretical findings, we plan to build experimental hoppers. We should be able to build a hopper with a certain discharge opening that will permit flow, and another hopper with a slightly smaller discharge opening that will not allow flow.



WELL-ENGINEERED plant layout reveals simplified, unimpeded production flow in one-story processing area. Flow of incoming green meats is split into two major lines: Smoked meats (left) and sausage products (right).

Dual 1-Floor Line Abolishes Production Tangles

Packer sparks streamlined process flow with improved methods. Multiplies output with advanced smoking, brining, packaging, and materials handling

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

"We're really sitting pretty—now that we've more than tripled production since moving into our new plant.

"What's more, we are no longer top-heavy with building stories. Nor are we stymied by criss-crossing of production flow, crammed for loading and unloading space, or forced to stop operations due to adverse weather conditions."

That's how top management painted the picture after Columbia Packing Co. opened its new million-dollar, production-planned meat-packing plant in Boston.

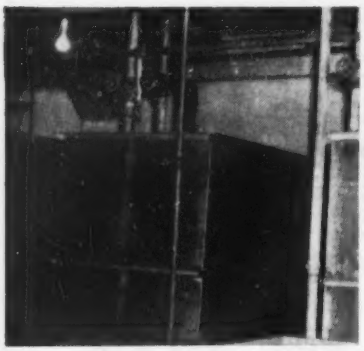
Outstanding is this firm's weekly increase in output—from 150,000 to over 500,000 lb. of processed meats. And this is now being achieved in a new single-story process area that occupies only 50% more floor space than the former multi-story facility. Efficient process-flow and advanced methods and equipment did the trick.

Increased business had demanded the expansion. And, at the same time, rising costs of the former properties called for modernization that would stress economy, production efficiency, and product quality with uniformity.

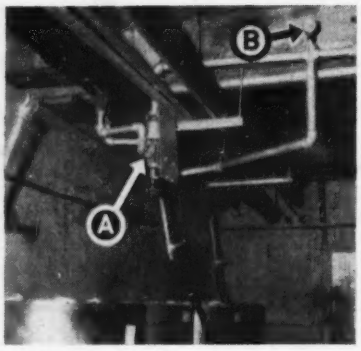
Then the company got a break. Its old plant had to be torn down to make room for a new super-highway. Then thorough studies by President Sidney Lang, and Murray Sherman, his vice-president in charge of production, revealed that centralization in a one-story modern plant was the logical solution. Moreover, this plant could be smartly designed for uninterrupted, straight-line, efficient production.

Accordingly, emphasis was given to advanced features in planning two major lines—one for handling smoked meat items along one side of the plant,

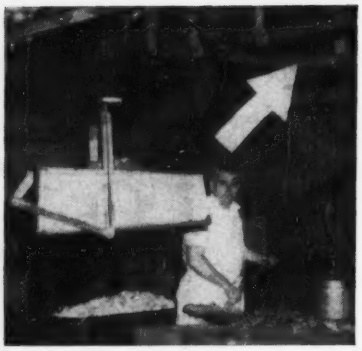
How Labor and Space Are Conserved



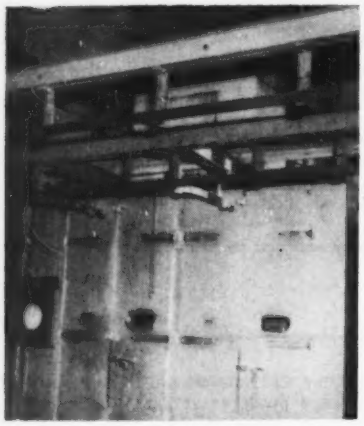
SAVED: About 7 hr. in preparation of curing solution in these three 1,000-gal. make-up tanks.



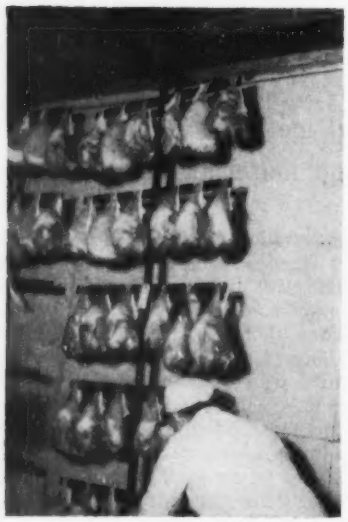
SAVED: Product quality in thawing frozen meats. Thaw-water temperature is controlled (A), checked (B).



SAVED: Handlings in transfer of meats to silent cutter by this bucket carrier suspended from monorail.



SAVED: About one-third floor space in smokeroom by installing pipes and ducts above bank-to-bank smokehouses.



SAVED: Smokehouse loading time. Adding 5th bar on trees did it. And so Columbia Packing Co. was able to increase its output 25%.

and the other for sausage products along the other side.

Other meat packers—particularly those with advanced food-plant planning in mind—will surely be clocking the pace this new plant sets.

How It Was

This firm's former 150,000-lb. weekly production overtaxed its old 30,000-sq. ft. multi-story plant—a facility that had grown into a hodgepodge spread out among five stories (with basement) and within six buildings linked by doors and serviced day-and-night by only two manually-operated freight elevators.

Flow of goods was constantly being interrupted by up-and-down elevator delays. Materials got blocked off in their across-the-floor movement. And production areas were cramped, with workers running smack into one another and into cluttered-up equipment.

Green meats, for example, were trucked to first floor via back door, since there was no railroad siding. Meats processed into smoked items (hams, butts, or shoulders), were hauled to cellar for curing, to 5th floor for smoking, to 2nd floor for packaging, and then to 1st floor for shipping.

Confusion multiplied and production-line performance suffered when sausage products were also being processed at the same time. Here, meats went from 1st to 3rd floor for processing (grinding, mixing, stuffing, and smoking), to 2nd floor for packaging, and then to 1st floor for shipping.

Considerable space was taken up by stairways in each of the six buildings and by areas in front of the two elevators handling in-plant up-and-down hauls between basement and 5th floor.

Aggravating was the loading of 2-ton, refrigerated peddler trucks in the former congested shipping area. Driver-salesmen had to scramble for parking space about 5 A.M., and then only eight trucks could be loaded at a time. And to make things even worse, they had to lift their loads onto trucks on the public sidewalk—since tailboard-loading facilities were unavailable.

Then there was only room for loading one trailer making long-distant shipments. When parking conditions got too bad, these common carriers would refuse to pick up loads.

Processing, too, was at the mercy of the weather. When demand for products may be very high—say during the last week of May when the weather may be quite warm—production had to be cut-back. Reason: Spoilage was likely to occur due to delays in moving finished goods through and out of the plant.

Built for Efficiency

Trail-blazing feature is the straight-through flow of production in the new 45,000-sq. ft. plant, where there are no longer any such processing delays as were formerly attributed to criss-crossing of traffic. All green meats arrive at an unloading dock that handles 6 RR cars and 2 motor trailers. The meats enter one end of the plant—at dead center.

Carefully purchased on the basis of daily production needs, the meats are whisked through processing. No storage freezers are required here.

As stated, processing is on two major lines—one for smoked and one for sausage meats. Production is rushed through unimpeded until all case-packed finished goods meet in the assembling-shipping area, located at the opposite end of the plant and also in dead center.

Another notable planning venture was the clever way of cutting down on temperature losses by spotting the smoking and cooking operation in the

center of the plant and coolers and chill rooms along the periphery. Capacity of smokehouses and coolers is now ample to handle any production.

There is a back-to-back bank of 8 one-story-high Julian smokehouses. Four on one side hold five-bar racks—trees that hold hams, butts, and shoulders. The other four handle five-stick cages of sausage products. Output from smoking operation is increased approximately 25% by raising the height of the houses to permit them to handle an extra bar- or stick-load of product.

Flexibility has also been engineered into the smoking operation. Aisle space flanking the houses permits shuttling of products in the event of unusually heavy demands. For example, should demand for smoked items be too great for a bank of four houses to handle, then the excess can be readily transferred to one or more houses in the opposite bank normally used for sausage products.

There is a second floor that is not devoted to processing. It is occupied by offices, a storage room for packaging materials and dry ingredients, lockers, and a lunch room. Movement of dry materials between storage and processing is by pushbutton elevator.

Impressive is the engineered line layout for smoked meats along one section of the plant. Incoming reefer-car shipments of frozen green meats (hams, butts, and shoulders) are loaded into skid-mounted, stainless steel curing vats, which are moved by low-lift hand truck over a floor-level scale in the 3-car capacity thawing room. Attached to each vat is a card designating the car number, size of product, and number of pieces.

Warm water is piped into curing vats to defrost frozen meats. To safeguard quality, this water is filtered and thermostatically regulated. A dial thermometer is set in the supply line.

This thawing room serves another purpose. It can be used to hold meats over week-ends. Temperature is brought down to about 32 deg. F. by dual, ammonia-refrigerated blower-type coolers.

Thawed meats now continue to the curing cooler. Depending upon product, they go either to pickle-injecting or boning-tying conveyors. Formerly, these operations were less efficiently carried out on stationary tables.

Assembly-line techniques have put higher efficiency into pickle-injecting operations. Employed is a 1½x40-ft. Neoprene-belt conveyor, flanked by 1½-ft. wide stainless steel pickle-pumping tables. Belts used throughout the plant are standardized on size to simplify maintenance and to reduce stocks of spare belting.

Conveying reduces the number of handlings required in the pickle-injecting work carried out by a gang of 40 pumpers. It also paces their work.

Further efficiencies are now attained by feeding hams to the pumpers, vein-side up. When pickled, hams are then put on the conveyor vein-side down to enable two men at the end of the belt (the fastest pickle-pumpers) to speedily spot and then inject unpumped hams.

Pickle-injected meats are finally put into stainless curing vats. These vats can be double-decked should there be any need to step up production.

Simplified Brine Make-up

Inherent in the operation of this pace-setting pickling line is the new, time-saving, brine make-up system. Formerly received in bags, rock salt is now bulk shipped and speedily unloaded from cars with a 2-ft. wide hand-operated scoop. Salt is shoveled from cars into six manholes feeding two 80-ton Lixators integrated in the unloading dock. According to General Manager George Braen, savings by the present unloading method amount to about $6 per ton of salt, or $6,000 a year.

Capacity of these Lixators is 1,000 gal. per min. of 100 deg. salometer brine. It is pumped at the rate of 300 gal. per min. into three stainless steel, 1,000-gal. pickle make-up tanks in the curing room. Water is also fed at the same rate to dilute brine to desired concentration.

Curing compounds are added, and the batch is air-agitated. Air, under 125 psi., is fed in at the bottom of each tank through a perforated pipe. If necessary, steam is similarly introduced, under 12-14 psi., to warm up the pickle solution. A constant-pressure pump carries pickle solution to the gang of pumpers.

Making up a 1,000-gal. batch takes about 2½ min., and one man devotes only about an hour a day to the job. Formerly, all his time was taken up for this work. Switching from an empty to a freshly prepared tank of pickle merely requires shutting off one valve and opening another.

Boning, Washing Conveyorized

Equally impressive is the mass-production techniques engineered into the ham boning-and-tying line. At the feed-end of a 1½x25 ft. Neoprene-belt conveyor is a Townsend skinning machine. Flanking this belt are 16 workers boning hams on wooden cutting boards. At the end of the belt are two 3-a-min. Griffith ham-tying machines.

Next, meats go to an adjacent unrefrigerated room and onto a multi-purpose line. In handling shoulders, for example, shanks are cut off with a band saw. A wire-mesh belt next moves shoulders through an enclosed washer, where sets of sprays are arranged above

Conveyorized Lines Assure Non-Stop Product Flow

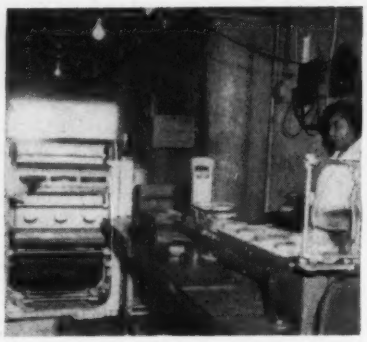
ASSEMBLY-LINE techniques have been engineered in pickle-injecting operations on this 40-ft. conveyor.

MASS-PRODUCTION methods have been introduced into this efficient ham-boning-tying line.

PACE-SETTING LINE features enclosed washer. Meats are then branded, trimmed, and stockinetted.

Advanced Meat-Packaging Lines Installed

CRY-O-VAC LINE handles link and loaf items. Line has six vacuum-pulling crimping stations and shrinker.



ON FLEX-VAC line luncheon meats are machine sliced and stacked. Slices are then vacuum-packed and sealed.

STRETCHWRAP unit packages wieners and chub items in snug-fitting Pliofilm wrapper.

and below the belt to play water over the meats. Water is regulated to about 80 deg. F., and what water drains from the meats is piped into the sewer.

Washed hams or shoulders continue onto a 1½x10-ft. Neoprene belt to be branded (1 man), trimmed (6 men), put into stockinettes (5 men), and hung on 5-bar trees (2 men). Speed of this line is about 2,000 shoulders per hour.

Processing butts on the same line merely involves replacing the band saw with a portable, power-operated stuffer. Two men operating the unit stuff butts into stockinettes at the rate of 45-55 per min.

Meats then proceed in orderly fashion on a rail scale before entering a bank of four smokehouses. Similar weighing of meats leaving houses provides a check on smoking efficiency. Each house handles 1,200 hams, 2,000 shoulders, and 3,000 butts.

An approximate 30% floor-space saving is obtained by locating hot air ducts and steam pipes on top of smokehouses instead of at floor level. These ducts and pipes are accessible by a stairway and catwalk. Smoke generators are in one of the aisles and adjacent to houses.

All houses are equipped with temperature and humidity recording and controlling instruments, placed next to smokehouse doors rather than at a centrally controlled panel. Rapid and more accurate control of smoking operations is assured with this arrangement, says Plant Superintendent Richard Oldham. Too, glass inspection ports enable the smokehouse operator to check products more easily and rapidly.

Periodically, internal product temperature is checked with a needle-point thermometer. Products are pulled out of smokehouses at conclusion of indicated processing time and after appearance of meats satisfies the attendant.

From smokehouses, meats travel by monorail to chill cooler and then to the hang-cooler. They then continue to smoked meat-packing room.

3-in-1 Packing Line

Stripping stockinettes from smoked butts hanging on 5-bar trees is now more speedily accomplished with a simple company-engineered cutting unit. Also, the job is now safer and there is no knife-damaging of butts. Employed is a Linker Machine knife blade (for cutting string from linked and tied sausages or franks), with ⅛ in. of the blade protruding from a 4½x⅝x⅜-in. wooden handle.

Four men supply stockinette-freed butts to a dozen packers. Three cut stockinettes and remove butts, and the fourth takes stockinettes off trees.

Butts are fed to a 1½x20-ft. smoked meat-packing conveyor, where twelve girls insert them into Cry-O-Rap (saran-type copolymer film) bags. Later, on the Cry-O-Vac line, bags are evacuated and water-shrunk into form-fitting, skin-tight packages.

To change the line over to handle shoulders takes only 4 min. Employed are the same men stripping stockinettes from shoulders. These are then fed to the packing belt. Another man operates a Bostitch box-maker and supplies cartons to the line. Two men hook printed tags onto shoulders, and another packs four shoulders to a carton. Finally, two men weigh and then seal cartons, which go to the order-assembling and shipping area.

Switching over to packing hams takes about the same time. Using a hook, three men remove hams from stockinettes, and another operates the box-maker. Still another feeds hams to a 2x2-ft. stainless steel table, where one man wraps them in triple-ply paper—two sheets of parchment and an inner sheet of absorbent material. Some hams are packaged in Cry-O-Rap bags.

Wrapped hams then go onto the conveyor to be string-tied by four men and packed two to a carton. Two men then weigh and seal cartons, which continue to the order assembling-shipping department. Empty trees go to the sweet pickle hanging room.

Manufacturing Sausage Products

Like smoked meat items, sausage products are manufactured in a separate section of the plant. Meats move from unloading dock, through a centrally-located door, into 20,000-lb.-capacity beef-carcass cooler, and then go to the boning room.

Actual processing starts in the sausage grinding-mixing room. Meat trimmings fed to two grinders (capacity 10,000 lb. per hr.) are comminuted and then collected in 500-lb. capacity mobile trucks. Ground meats continue to a specially-designed weighing-dumping station.

Employed are two 300-lb. stainless steel buckets suspended on a circular, overhead monorail. Bucket-loads of ground meats are formulated as they are weighed on a scale rail and then unloaded into two silent cutters. Traveling buckets can be shunted from one side of the rail to the other side.

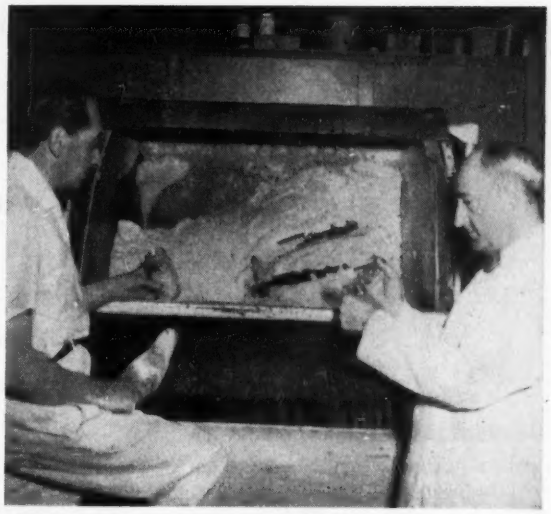
Also in this room are two 800-lb. horizontal-type mixers for meat loaves and similar items. And adjacent is the spice room.

Trucks (800-lb. capacity) carry meats to sausage-stuffing room. Two stuffers are hooked in tandem for continuous feeding of stuffed meats (in artificial casing) to four automatic linking machines. Each machine links 114 frankfurters or sausages per minute. By removing the four linking machines from this line, large bolognas can also be stuffed.

Additional stuffers are used—one for all-beef frankfurters (stuffed in

(Turn to page 140)

SOUP MIXES that target superlative taste—even surpassing homemade qualities. Here, Lab Technician Lillian Lippman displays 11 of the 50-odd mixes packed by Mary Lynn Foods for the institutional trade.



CHICKEN-SOUP BASE is carefully blended in this mixer by Ernest Mangold (left). Dr. Eric Eichwald (right) obtains sample to determine if batch meets "specs." Dry mix for vegetable soup is similarly prepared.

Better Dehydrated Soup Mixes

Enterprising New York firm builds paying business by combining convenience feature with extra-high quality . . . Institutional opportunities seen "wide open"

FE STAFF

You can "crack" the great and growing institutional market for processed foods with quality convenience items.

That is being demonstrated by the Mary Lynn Food Division of Choldun Mfg. Co., New York City, a maker of some 50 different dehydrated soup mixes for the institutional trade.

Members of an outside taste panel not only rated Mary Lynn soups superior, but asked: "Where can we buy them?

Mary Lynn's manufacturing operations primarily involve careful scaling, formulating, and blending of quality dried ingredients with herbs, seasonings, shortening or chicken fat, and beef or chicken extract.

Key to the success of this fast-growing business, says Chief Chemist Eric Eichwald, lies in the ingredients employed. Not only must top-quality ingredients be selected, but the quality of the materials must be double-checked—upon receipt and before use—to make certain that they conform to standards.

Approximately 95% of the ingredients are from domestic sources. The remainder are purchased abroad—herbs and dried mushrooms coming from France, dehydrated onions and carrots from Holland, waldmeister from Germany, spices and herbs from Haiti, and spices from Formosa.

A close check is maintained on all incoming raw materials for moisture content. And the inspection also guards against residual insecticides such as DDT, as well as the presence of mold, insects, and other objectionable extraneous matter.

The check on proper moisture content is essential, for dehydrated vegetables and meats with excessively low moisture will impart a "strawy" or flavor-lacking property to finished products. Also, the finished soup mixes will be difficult to reconstitute with water. Too much moisture is not good either, for then the soup mixes are likely to become moldy within a short time.

Examples of specifications set up for moisture are 2-6% for peas, 3-8% for carrots, 6-8% for chicken, and 6-12% for noodles. When the moisture content of noodles falls below 6%, they become brittle and then on handling break up into small pieces, and even into a powder.

Chicken fat is checked to determine if it has been properly rendered. It must be free from water and small pieces of chicken meat. Shortenings are checked for moisture, FFA (free fatty acids), and peroxide value. And all fats (chicken and shortenings) should be shipped in un-used drums.

SINGLE-SPOUT FILLER measures 1-lb. of chicken-broth base into jars. Capping and labeling follow.

Soup mixes made from purchased dehydrated ingredients offer the small manufacturer the advantages of—

1. Omitting certain unit operations, such as the preparation of soups in cooking kettles, thermal processing in

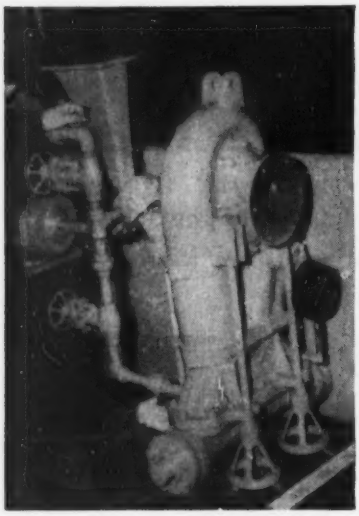
(*Turn to page 173*)

EQUIPMENT PARADE

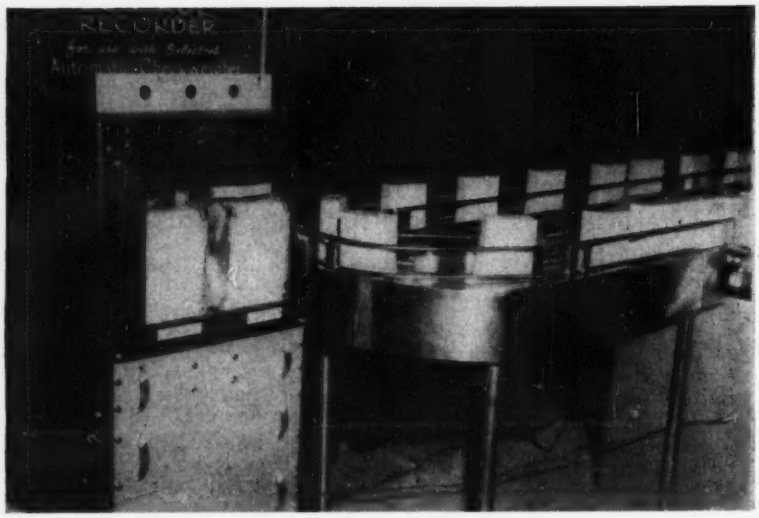
Viewed by Food Engineers

This special 4-page picture-report depicts latest machines, instruments, and accessories for improving operating efficiencies. Displayed in recent big Chemical Industries Exposition in Philadelphia, units are grouped according to food field applications

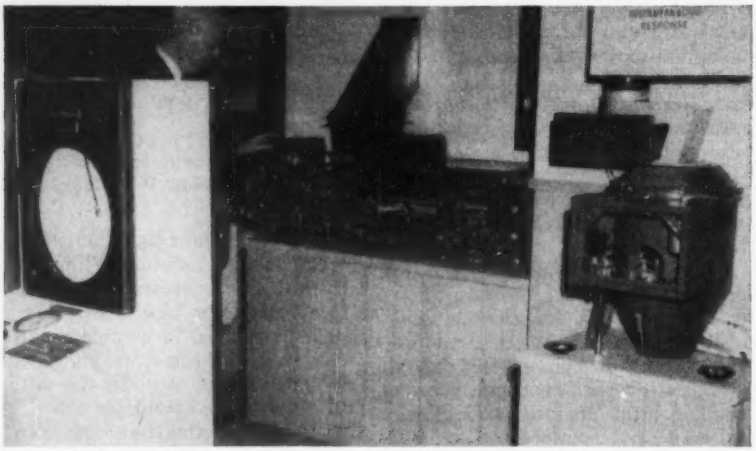
LIQUID FLOW is continuously measured in pounds by this inertia flow meter. It operates on gyroscopic principle. Control Engineering Corp., Norwood, Mass. (80A)



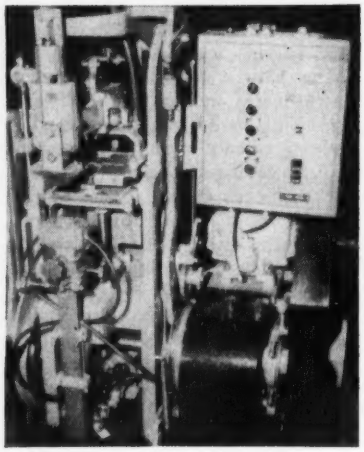
FINE particle producing fluid-energy mill, no moving parts. C. H. Wheeler Mfg. Co., Philadelphia. (80B)



AUTOMATIC control system for filling machine comprises checkweigher (right) and companion equipment (left) that computes and chart-records averages of packages weighed. Exact Weight Scale Co., Columbus, Ohio. (80C)

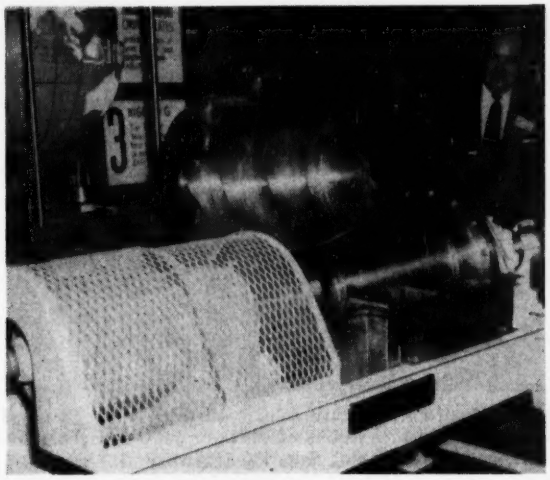


FREE-FLOWING materials are blended in desired proportions by this assembly —gravimetric feeder (left). Massometer (right). Latter is weighing meter operating on force balance principle. Wallace & Tiernan, Belleville, N. J. (80D)

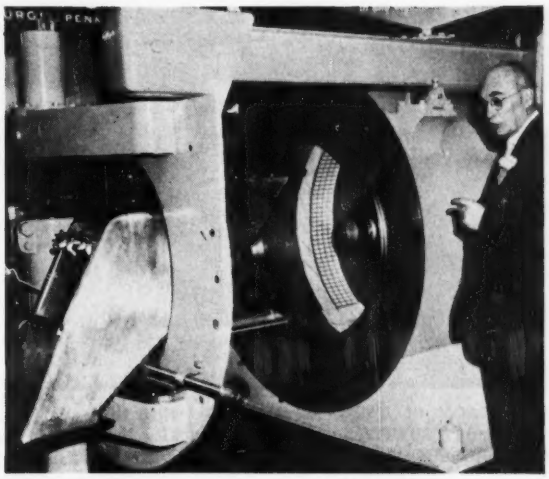


DECALS are applied to heated bottles by semi-automatic unit. N. J. Machine Corp., Hoboken, N. J. (80E)

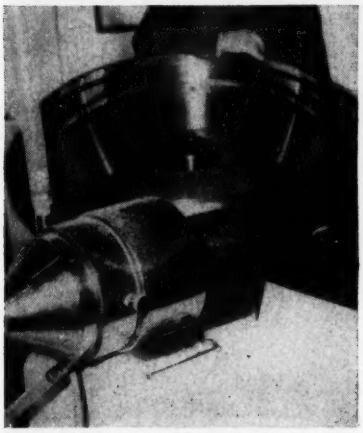
Centrifugals, condenser, separator, mixer



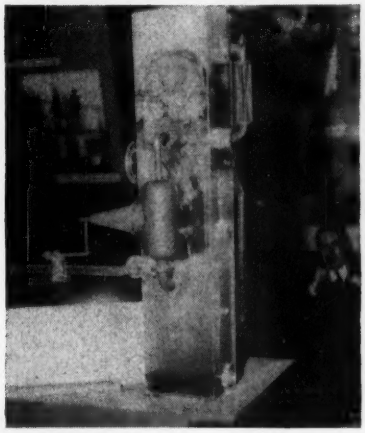
FLEXIBLE continuous centrifugal affords variable beach speed, pool depth, and force field. Tolhurst Centrifugals Div., American Mach. & Metals, East Moline, Ill. (81A)



INTERIOR of this perforate basket-type dewatering centrifugal is readily exposed, with head and outlet chute on boom. Heyl & Patterson, Inc., Pittsburgh. (81B)

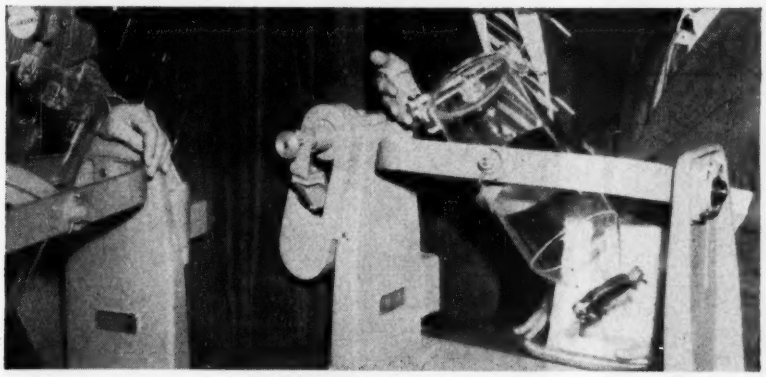


HIGH-SPEED, vertical centrifugal separates crystals from liquids continuously. Washes, too. Merco Centrifugal Co., San Francisco. (81C)



FLOOR-MOUNTED, direct-contact condenser (model shown) is easily installed indoors. Ingersoll-Rand Co., New York City. (81D)

IN THIS unit, small-particle dust is separated from air stream by centrifugal force alone. Superior Separator Co., Hopkins, Minn. (81E)



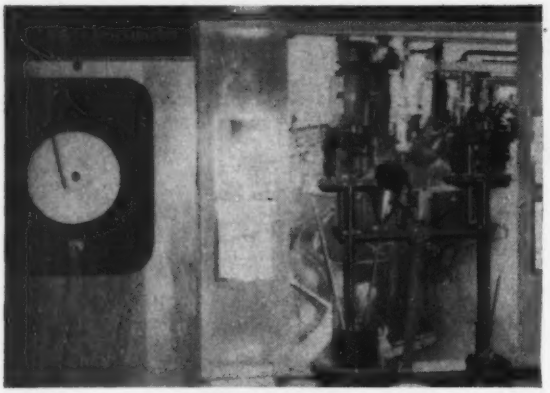
CONTAINER ANGLE on this laboratory model blender is adjustable within rotating shaft as desired for particular material. Clear plastic construction permits visual inspection during mixing. Arthur Colton Co., Div. of Snyder Tool & Engineering Co., Detroit. (81F)

ZERO TO MAXIMUM control is provided by this automatic pump assembly. Philadelphia Pump & Machinery Co., Inc., Wynnewood, Pa. (81G)

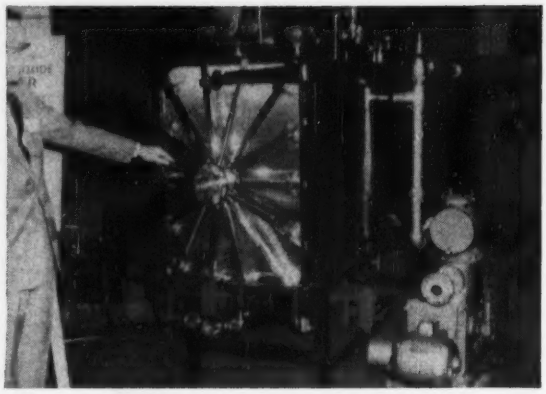
Want more information about any items in this picture article? Just circle the key number (end of each caption) on Readers Service coupon page 159

More on Next Spread ⟶

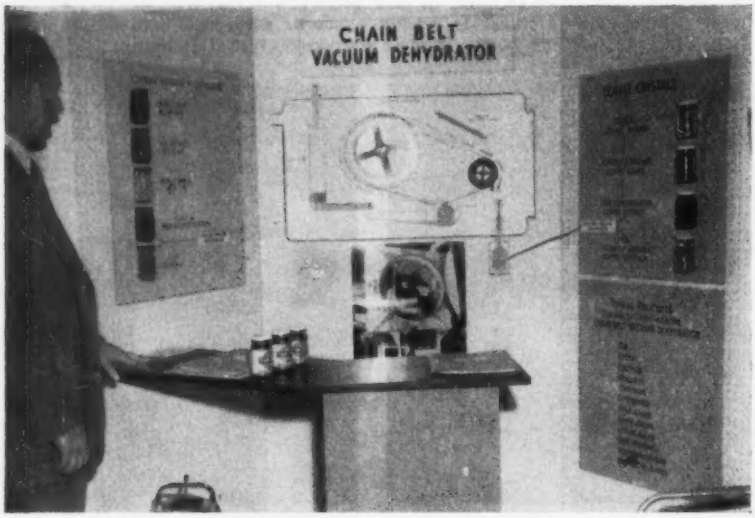
Dryers, control instruments, ultrasonic unit



ACCURACY of 0.25% is attainable with this sensitive viscometer. Measurements are electrically transmitted to recorder chart. Norcross Corp., Newton, Mass. (82A)

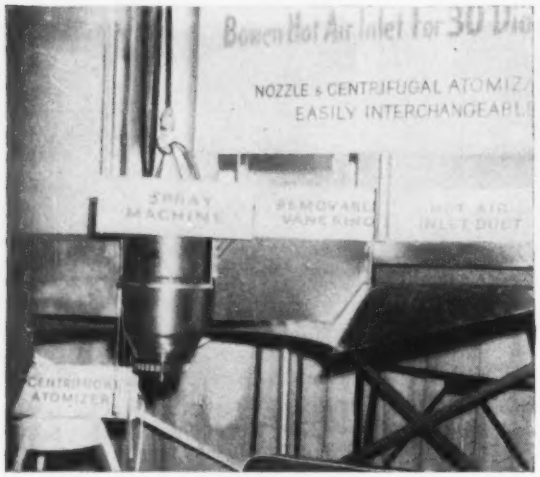


IN THIS UNIT, moisture sensitive foods can be handled without undesirable effects of steam or hot air sterilization. American Sterilizer Co., Erie, Pa. (82B)

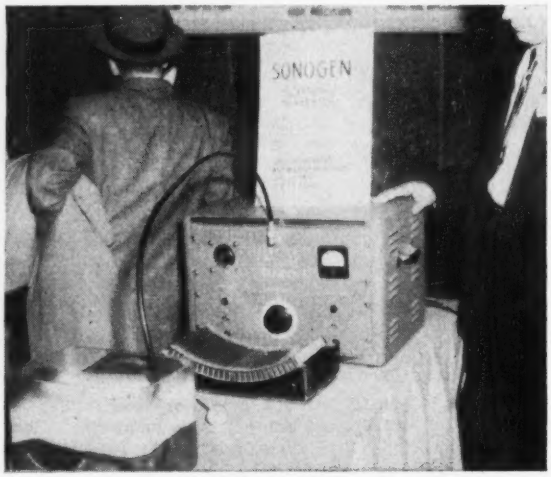


SCHEMATIC PANEL shows major components of vacuum dehydrator system employed in drying of heat-sensitive liquid food products on continuous high production basis. Chain Belt Co., Milwaukee. (82C)

LIGHTED PANEL reveals sequence of flow through dryer. Proctor & Schwartz, Philadelphia. (82D)



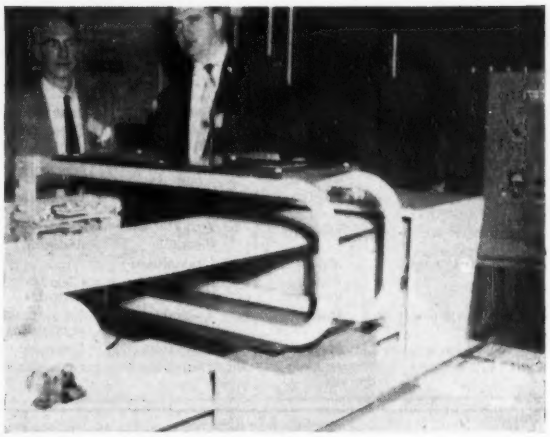
ATOMIZATION components, nozzle and centrifugal, are easily interchangeable in hot-air, 30-ft.-dia. spray dryer. Bowen Engineering, North Branch, N. J. (82E)



CURVED transducer of this unit focuses ultrasonic energy to obtain high intensities in working region. Branson Instruments, Stamford, Conn. (82F)

Filters, inspection units, insulation

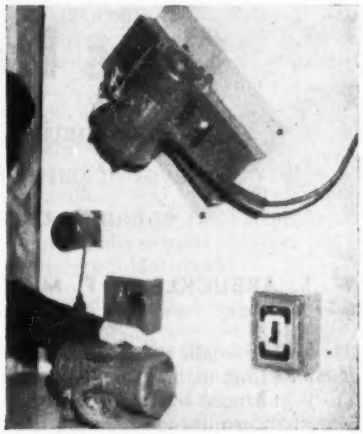
AUTOMATIC spectrophotometer plots percent transmittance (energy vs. wavelength) on 8½ x 11 in. paper. Beckman Instruments. South Pasadena, Calif. (83A)



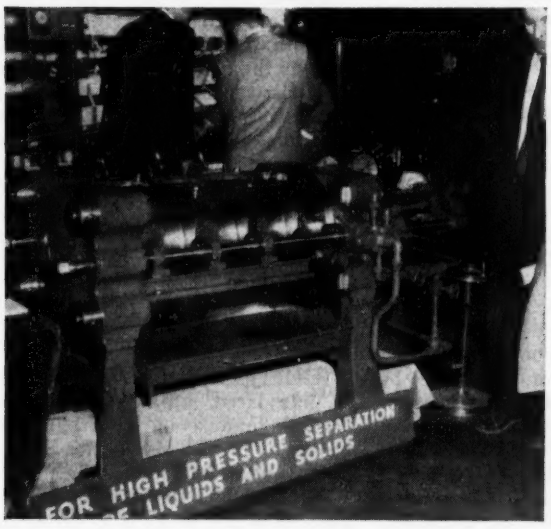
HINGED, general-purpose GE metal detector can be installed on conveyor lines without disturbing belts. Stearns Magnetic, Milwaukee. (83B)

FAST dewatering is attained with horizontal, rotary vacuum filter. Filtration Engineers, Newark, N. J. (83C)

MODEL of rotating disk contactor for liquid-liquid extraction. Gen'l Amer. Trans. Corp., Chicago. (83D)



QUICK-CHANGE brackets and quiet operation mark new vibrators. Cleveland Vibrator Co., Cleveland. (83E)



PILOT press used in volume-test runs determines capacities for filtering materials on production basis. Offered by Fred. S. Carver, Inc., Summit, N. J. (83F)

WATER-REPELLENT 85% magnesia is new treated insulation for service on hot and/or cold lines. Exhibited at booth of Mundet Cork Corp., North Bergen, N. J. (83G)

Solubility-Flavor-Formula Data

TABLE I—SOLUBILITIES of Vanitrope—Vanillin (1:7) Vary in Different Solvents at 40 Deg. F.

Solvent	Odor Characteristics	Solution Strengths, Percent: Two	Four	Six	Eight	Ten	Twelve	Remarks
Cotton oil	Harsh	Clear, desirable	Crystallized	.....	.....	.....	.....	Fair
Corn oil	Slightly harsh	Desirable	Liquid, and crystallized	.....	.....	.....	.....	Fair
Peanut oil	Mild	Viscous, desirable	Crystallized	.....	.....	.....	.....	Fair
Tween 60 SD	Harsh	Clear, desirable	Clear, desirable	Clear, desirable	Clear, desirable	Clear, desirable	Clear, desirable	Very Good
Soyabean oil	Mild	Crystallized	.....	.....	.....	.....	.....	Very Poor
Butter oil	Pleasant, mild	Clear, desirable	Clear, desirable	Crystallized	.....	.....	.....	Good
Olive oil	Pronounced	Desirable	Liquid, and crystallized	.....	.....	.....	.....	Poor
Cocoanut oil	Mild	Desirable	Desirable	Crystallized	.....	.....	.....	Good
Lard	Pronounced	Desirable	Crystallized	.....	.....	.....	.....	Poor

Vanilla-Like Synthetic Cuts Ice Cream Flavor Cost

In combination with vanillin or vanilla extract, it duplicates the flavor of pure product at 1/3 the cost. Used alone in other mixes, it enhances flavor of chocolate, nut, and "butter" type ice creams

W. S. ARBUCKLE, L. F. M. CREMERS and D. J. SEELY
Dairy Department, University of Maryland, College Park, Md.

Flavor of vanilla ice cream, whether obtained from natural vanilla or vanillin, is enhanced by use of a recently perfected, vanilla-type flavoring material—propenyl guaethol.

And its addition to other mixes improved the flavor of chocolate, nut, and "butter" type ice creams.

Also, flavoring cost may be reduced as much as two thirds.

The product, named Vanitrope*, has a rich, sweet, delicate aroma, and a pleasant vanilla-like taste. It has been evaluated by Tyler[1] on the basis of flavor strength equivalent and quality of odor and flavor in comparison with natural vanilla extract, vanillin, ethyl vanillin, and coumarin.

She found that the new product was 20 times as strong as vanillin crystals, and about 150 times as strong as vanilla extract. It was used in preparation of extracts with vanilla-like flavor by: (a) Combining with vanilla and vanillin to provide a very high quality flavor, and (b) replacing a portion of vanillin to give a less expensive but more vanilla-like flavor than that of either vanillin or ethyl vanillin.

Because of the new product's excellent flavor qualities and low use-cost, a decision was made to investigate its use in ice cream.

Therefore, a project was set up to study: (a) Methods of incorporation into ice cream mixes as a flavoring material, and (b) flavor characteristics imparted to ice cream by its use.

Mixes were prepared under commercial ice cream plant conditions. They contained 12% fat, 11% milk solids-not-fat, 15% sugar, and 0.3% stabilizer, unless otherwise stated. They were pasteurized at 160 deg. F. for 30 min., and homogenized on a two-stage unit at 2,500 lb. pressure. The same source and kind of ingredients were used throughout the study.

Propenyl guaethol was incorporated in various amounts and combinations during mix pasteurization in an attempt to determine the optimum method of preparation and of using the product for flavoring purposes by the ice cream manufacturer. Mixes were frozen in a batch freezer to an overrun of 90%. Pint packages were drawn for flavor observations. Finished ice cream was observed for flavor, body and texture, melting properties, color, and keeping qualities. Various mix properties were observed to determine if they were affected.

Product was introduced into ice cream in combination with vanillin alone, vanillin and pure vanilla extract, and pure vanilla extract. These preparations were used in various fold strengths to determine the optimum concentration required to produce desirable flavor characteristics. Tween 60 SD**, propylene glycol, and various oils were studied as solvents.

Various amounts of the flavor were added to different fruit and nut ice creams to gage its value in these products. In these tests it was added to the basic mix or mixed with the fruit or nut flavoring material. Flavor observations were made by a group of three experienced judges. Standard organoleptic panel methods were used also in examining the flavor characteristics. Flavor evaluations were made by direct comparison of the different ice creams.

Preparing Flavor Combinations

Results indicate than Vanitrope can be introduced into ice cream in a flavoring formula at a 1:7 or 1:20 ratio to vanillin or with pure vanilla for the purpose of extending its flavor.

The 1:7 ratio formula can be prepared as a 2% solution by dissolving 1 part Vanitrope and 7 parts of vanil-

* Vanitrope is the trade name for propenyl guaethol, manufactured by Fine Chemicals Div. of Shulton, Inc., Clifton, N. J.

** Tween 60 SD is available from Atlas Powder Co., Wilmington, Del.

Reveal 'Frame of Performance'

TABLE II — PANEL OBSERVATIONS of Ice Cream Flavored With Natural Vanilla and Various Artificials

Mix	Flavor Preparation	Panel Rating*	Flavor Observations
1.	Vanitrope-vanillin (1:7) in butter oil (½ oz. 4% solution/10 gal. mix)	2.8	Mild vanillin flavor
2.	Vanitrope-vanillin (1:7) in butter oil (½ oz. 4% solution/10 gal. mix+70 cc. pure vanilla 1-fold)	3.3	Mild vanilla flavor
3.	Vanitrope-vanillin (1:7) in cocoanut oil (½ oz. 4% solution/10 gal. mix +70 cc. pure vanilla 1-fold)	3.5	Mild vanilla flavor
4.	Vanitrope alone (0.0132g. in 20g. butter oil/10 gal. mix)	3.3	Mild pleasant flavor
5.	Vanitrope (0.0132g. in 20g. butter oil) (+70 cc. pure vanilla/10 gal. mix)	3.2	Mild pleasant vanilla flavor
6.	Pure vanilla (10 oz. 1-fold/10 gal. mix)	4.0	Full vanilla flavor

TABLE III—EFFECT of Different Strength Combinations of Artificials and Pure Natural Vanilla Extract Used for Flavoring Ice Cream

Mix No.	Flavor Used (Oz.)	Vanitrope-Vanillin in Tween 60 SD Solution (Percent by Weight)	Mix (Gal.)	Fold Strength of Flavor	Comments
1	½	2	10	11	Lacks flavor, flat.
2	½	3	10	16	Pleasant, vanilla-like flavor.
3	½	4	10	22	Mild, very desirable.
4	½	6	10	33	By-flavor appears.
5	½	8	10	44	Pronounced by-flavor shows.
6	10	(Pure vanilla extract**)	10	20	Full, desirable.

* Rating in comparison to natural vanilla flavor: 4.0, excellent, very good; 3.5, good; 3.0, fair; 2.5, poor.

** This was "back calculated" into ½ oz. 20-fold theoretical strength to provide same volume of flavor for facilitating comparison with Tween solutions.

lin in 392 parts of solvent by weight. If considered, on an average, to have 20 times the flavor strength of vanillin, then the 2% solution of the 1:7 mixture is approximately 11-fold in flavor.

The 1:20 ratio formula can be prepared as a 4% solution by dissolving 1 part Vanitrope and 20 parts vanillin in 479 parts solvent. This solution is also 11-fold in flavor strength. Formula may be diluted to any desired fold by using a 10% solution of propylene glycol in water, provided Tween 60 SD is used as the flavor solvent. The new product can be used alone to extend flavor of pure vanilla extract. It is best added as a 2 to 4% solution in a suitable solvent.

Results of solubility observations made on 1:7 preparations of various concentrations in different solvents, are shown in Table I.

In most of the solvents, the mixture crystallized at the 4% level. Soybean oil did not keep 2% in solution, but Tween 60 SD satisfactorily dissolved 12% of the mixture. Best solvents in order of preference appeared to be Tween 60 SD, butter oil, coconut oil, and corn oil.

Solubility of Vanitrope alone in various solvents appeared to be somewhat greater than the above mixture.

In Vanilla Ice Cream

Results of preliminary studies indicated that the concentration necessary to gain desired flavor characteristics in vanilla ice cream was in the range of ¼ oz. 20-fold strength/10 gal. of mix. Mixtures of 1:7 or 1:20 ratio seemed to be equally satisfactory. When the various solvents were observed as carriers, butter oil proved to be a good solvent and to have excellent flavor-blending qualities.

Coconut oil gave good flavor results and showed good solvent properties. Tween 60 SD was an excellent solvent but produced only fair flavor characteristics. Cottonseed and corn oils had only fair solvent properties as well as fair flavor characteristics in the finished ice cream. It seems that any one of the above solvents, depending upon prevailing practical conditions, can be used satisfactorily for adding the flavor to ice cream mix.

Olive oil, peanut oil, soybean oil, and lard failed to give desirable results because of undesirable solubility or flavor characteristics. Use of butter oil as solvent has these advantages:

1. It is "free", since its cost is charged against the mix formula from which it is diverted.

2. Introduction in butter oil produces a synergistic creamy enrichment of the basic ice cream flavor, in addition to the vanilla effect.

3. It avoids the use of the Tweens and foreign oils, when desirable.

A "stock" 4% solution in butter oil can be prepared as follows: warm 6 lb. of butter oil to about 140-160 deg. F. Then stir in 4 oz. of Vanitrope until dissolved.

This procedure gives about ¾ gal. of flavoring stock, or 100 oz. by weight.

Appropriate quantities of this stock solution (see Table II) are introduced into the ice cream mix during the pasteurization operation.

Table III shows the flavor observations for five different (1:7 ratio) compositions used in flavoring ice cream. A pure, natural vanilla extract is also shown for comparison. The fold strength is calculated on the basis of 1-oz. vanillin per gallon of solution being equal to a 1-fold flavor. As shown previously, a 2% solution of the 1:7 ratio is 11-fold in flavor strength.

Observations indicate that the 16- and 22-fold strength preparations produced the most desirable results and compared favorably with the product flavored with the pure vanilla extract. The close relationship in flavor strength of this pair (Mixes No. 3 and 6) indicates that the new product must have a flavor strength approximately 25 times greater than vanillin in this application.

Economy of Use

A cost comparison of the various flavor compositions in Table III, based on the raw material prices presented below, is offered as showing the economy of using Vanitrope.

Material	Cost
Tween 60 SD	$00.60 per lb.
Vanillin	3.00 per lb.
Vanitrope	27.00 per lb.
Pure vanilla extract (single fold strength)	10.00 per gal.

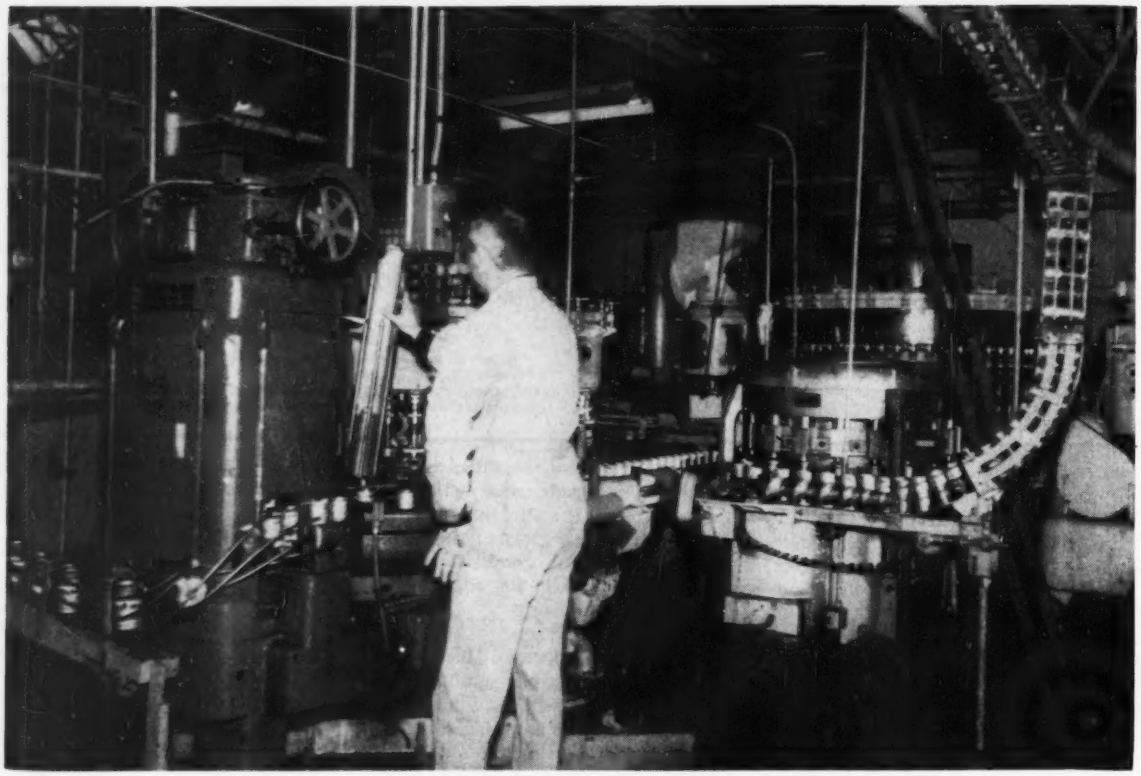
Since Mixes No. 3 and No. 6 were approximately equal in flavor strength, it is apparent that the cost of Vanitrope is approximately one-third that of the pure vanilla flavor.

An examination of ice cream containing 0.025g., 0.0166g., and 0.0132g., respectively, of Vanitrope per 10 gal. of mix revealed that the optimum amount for most desirable flavor ranged from 0.0132 to 0.0166g. Mixes containing more than the 0.0166g. showed pronounced by-flavors. Use of the new product seemed to have no effect upon the various physical properties of the mix or finished ice cream.

Panel observations were made of ice cream flavored with various combinations that had been selected previously from preliminary studies as giving favorable results. (see Table II).

The flavor observations indicate that Vanitrope alone or blended with vanillin and natural vanilla extract produced desirable results when used to flavor vanilla ice cream. The ice cream containing Vanitrope and vanillin in combination with pure vanilla extract had a mild, pleasant flavor that compared favorably with that containing pure vanilla extract. When the new flavor was used alone, the ice cream was observed by the panel to

(Turn to page 139)



WORKING from a central control, one man operates the two synchronized fillers and can seamer.

Upsurge: In *Canned* Soft Drinks

Marked momentum in canned carbonated beverages is noted on West Coast . . . White Rock engineers a special package-type line for streamlined operation in limited space

GEORGE F. KAY
Dielionics Laboratories, Consultant to White Rock Bottlers Co., Los Angeles, Calif.

Western carbonated beverage bottlers recently awoke to find a strange bedfellow in their midst—the **canned** soft drink.

And this new infant had to be classed as an interloper. For having been sired by a brewer—Sheridan (Wyo.) Brewing Co.—its eligibility for official entry in traditional soft-drink family records was highly questionable.

Just having emerged from economic doldrums by raising the price of soft drinks from a nickel to a dime, Western bottlers eyed this newcomer with suspicion. Now operating on the black side of the ledger, they weren't much inclined to permit any johnny-come-lately to muscle into their field by marketing soft drinks in cans.

Then White Rock Bottlers of California became one of the first of a now rapidly increasing number to give serious consideration to this new means of packaging their product. In fact, this company has made a habit of being first with new bottled products on the Coast. In this instance, it followed conventional business and processing methods to ascertain the potential of the canned product.

All bottlers realize that the carbonated beverage field was built on the premise that soft drinks have good shelf-life and can be produced with proper carbonation in glass bottles. But, brewers had found that beer was acceptable in cans. And canned concentrated juices were selling in huge volume. So why not soft beverages?

First step in this preliminary study was to make a consumer survey to get the reaction of Californians to canned carbonated drinks. And results were encouraging. Mrs. Consumer has become accustomed to buying beverages in cans. As such, they were not foreign to her refrigerator. Next step was to determine the type of can which would—

1. Give flavors the same protection from spoilage as glass bottles.
2. Allow canning of the same high-quality flavors without technical problems.
3. Have high sanitation characteristics.
4. Lend itself to the most attractive shelf display.
5. Stack on shelf and in refrigerator with minimum of waste space.

To arrive at a sound conclusion, both the cone-type with wax-liner over lacquer and the flat-top, sanitary, 12-oz., vinyl-lined cans were considered. But neither can seemed to be completely satisfactory.

The company eliminated the wax-

Bottlers and Brewers Better Watch This One

It looks very much as though a new trend may be getting under way in the carbonated beverage field. We refer to "bottling" the product in tin rather than glass.

Advantages, of course, are lighter shipping weight and less shipping and storage space, plus an opaque container which blocks whatever harmful effect light may have on the quality of some beverages.

Disadvantages include higher container cost, need for such special considerations as selection of a can to hold the high-pressure carbonation and use of proper can liner, and also the solution of various operating problems—as covered in this article.

But the interest among bottlers is extensive, and much research is being done by container companies.

Every bottler should make himself familiar with the pros and cons, and the trend in beverage canning. It not only may affect his sales, but it may open the way to larger, more centralized bottling operations and long-distance shipment to market areas.

Even the brewers may decide to get into the business. One already has, in fact.—*The Editors*

lined cone-type can for several reasons. To insure proper can sterility at the filler it is necessary to subject the inside of the can to steam and sterile hot water. At the temperature required for sterilization—160 deg. F.—the wax-liner would probably melt. It softens at about 140 deg. F. After filling with a beverage having a temperature of 38-40 deg. F., cans must be warmed, otherwise they will subsequently sweat in the closed cases. It would be difficult, if not impossible to subject the wax-lined cans to the proper temperature in the can-warmer without injuring the wax film.

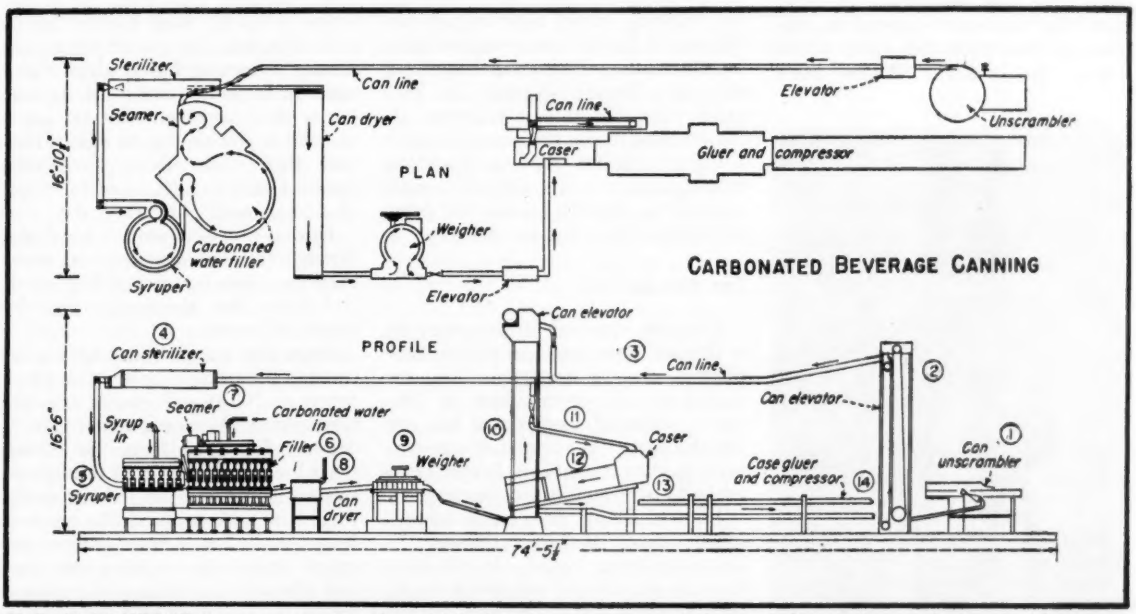
Further, this type of can will not stack well on shelves or in refrigerators. And, finally, there is also the possibility of the wax becoming brittle and crystallizing at low temperature in home or other storages.

Use of cans for soft drinks is not entirely new. They had been tried in this area several years ago, on a small-scale experimental basis. But the trial was not successful due to lack of a plastic liner that could resist attacks from fruit acids, oils, air, etc. However, search for a satisfactory can eventually led to The Pacific Can Co., San Francisco, where a new type of can-liner (comprising a prime coat with a vinyl overcoat) had been developed.

Pacific's research lab had made a 2½ year study to produce a satisfactory liner that would provide proper shelf life for carbonated beverages under experimental packing conditions. This type of liner, developed in combination with corrosion-resistant steels, ably resists all chemical action from syrups. While the cone-top can will withstand higher gas pressure, this flat-top can is being filled satisfactorily with beverages having 3.3 volumes CO_2.

Thus having a favorable reaction from consumers and a can that was suitable for soft drinks, White Rock research turned to storage life and quality effects, if any, relative to a variety of flavors of commercially canned beverages. Currently not conclusive, the results nevertheless were such that the company elected to take a calculated risk and make the necessary capital investment in a canning line to produce and market canned soft beverages.

In the production of quality carbonated beverages, each product has some individual complexities, so the installation of a canning line was only the beginning. The mechanics and techniques of the canning operation were



IN THIS COMPACT beverage canning line (16 ft. 6 in. by 75 ft. 5½ in.), cans are dumped on unscrambler (1), elevated (2) to overhead can-line (3), then sterilized (4). Product is filled in synchronized syruper (5) and carbonated water filler (6), then cans are seamed (7). Product temperature is now raised to 72 deg. F. in can dryer (8). Next, each can is weighed (9), then elevated (10), and rolled through twists and turns to mix product (11). Casing and gluing steps follow (12), (13), and (14). Plan drawing (top) further elucidates layout.

then studied. One of the major problems was to decide whether the product should be pre-mixed or made by syruping and then adding carbonated water the way most soft drinks are prepared.

White Rock chose the latter method. This required the installation of two fillers, one for syrup and one for carbonated water. In the interest of measuring amounts of flavors and economy, it was necessary to find a filler that would fill 2-oz. of syrup to a tolerance of 0.05 oz. and have a capacity equal to that of a 50-spout beer-type filler.

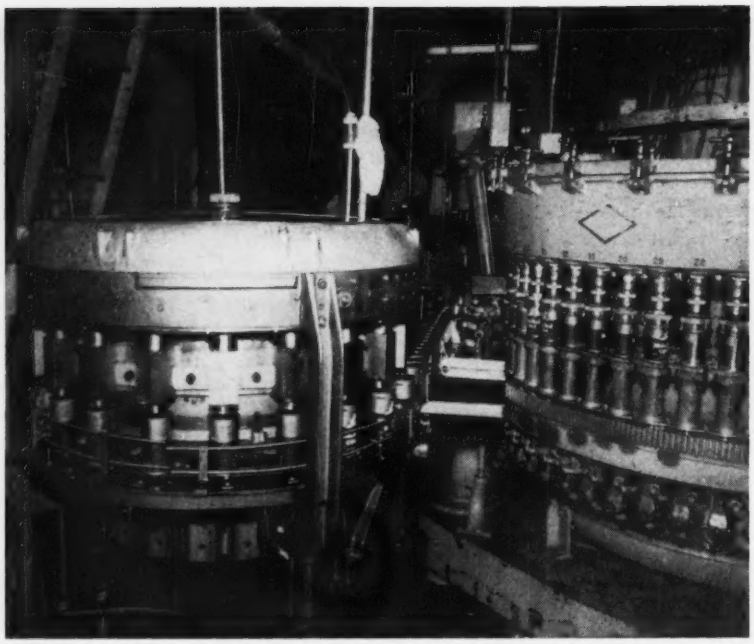
Fillers Adapted

Being a new type of canning process, there were no syrup fillers made specifically for this process. So a type used in the frozen orange juice process was satisfactorily adapted for this purpose. The second filler, for carbonated water, is a 50-spout Liquid Carbonic (beer-type) filler having a capacity of 300 cans a minute.

Having overcome the syrup-filling obstacle, the next step was to devise some means of heating the cold, filled cans to room temperature to eliminate sweating and still have a continuous operation at top can speed. Temperature differentials between the cold cans and ambient temperatures would cause moisture accumulation and subsequent corrosion of the metal.

Pasteurization subsequent to canning would sterilize the product and simultaneously warm the can, eliminating the corrosion problem. However, this was not essential to the process. Also such treatment would impair the delicate White Rock flavors. Moreover, the can, already under pressure through carbonation, would not withstand the high pressure build-up from pasteurizing.

PRODUCT LINEUP: Cola, True Fruit Orange, Lemon Lime, Root Beer, and True Fruit Black Cherry.



CANS MOVE from syrup filler (left) to beer-type carbonated water filler (right). And subsequently they go to seamer (rear center).

With the cooperation of The Five Point Engineering Co., a drying tunnel was then devised through which cans move at top speed and in which a hot water spray successfully brings them to room temperature.

Like most other bottling companies, the growth of business had so crowded the bottling room with equipment that only a limited space was available for the can line. Five Point Engineers and, also, Standard-Knapp Co., prepared plans for this installation. A combination of the two plans provided a highly efficient canning operation encompassed in a relatively small space. It is operated by only five men, including a lift-truck operation.

The Process

Cans are received at the plant in re-shipper cases and on pallets supplied by the can company. They are moved to the unscrambler by lift-trucks, dumped, and travel first by elevator then by overhead can-conveyor to the can sterilizer. Empty cases are belt-conveyed to the can-casing.

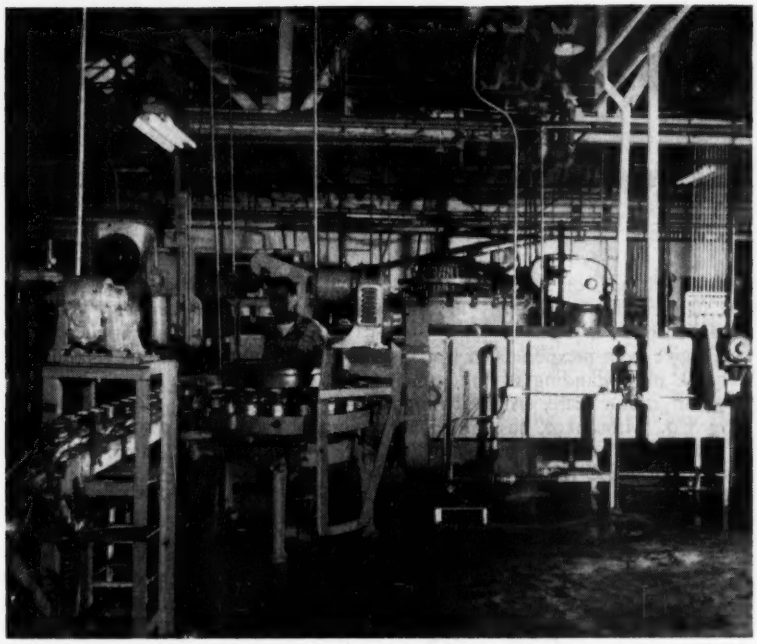
Prior to filling, cans are conveyed, upside down, through a 160 deg. F. steam sterilizing tunnel. In addition, they are spray rinsed with sterile water (diatomaceous-earth filtered, soft, chlorinated water). Major problem in canning soft drinks is the removal of any airborne yeasts that may have accumulated in the cans.

The sterilized cans then move through turns and twists (in the can line) to throw-out any accumulated moisture and go to the syrup filler.

The syruper, carbonated water filler, and can seamer are synchronized. Following addition of the proper amount of syrup, cans move to the beer-type filler, where carbonated, 38-40 deg. F. water is filled on top of the syrup. A Carbo-Cooler, formerly used for bottling, supplies this unit. As a can moves out of the filler, a jetter injects pure CO_2 into the top of the liquid, causing a foaming action which eliminates air from the head-space. According to the type of product, the gas is injected at pressures up to 8 psi. Filled cans then move directly into the Pacific Can Co. lid seamer by means of a rotary feed.

During subsequent conveying through the can-line, the cans move through a number of 180 deg. twists and turns that thoroughly mix the syrup and water.

From the seamer, cans next move through the tunnel can-dryer in which sprays of 160 deg. F. water raise the temperature of can and contents to 72 deg. F. Emerging from the drying-tunnel, cans are conveyed through an automatic net weigher, where underweight cans are magnetically rejected. Properly filled cans move onto an elevator, across an overhead can line, and through a system of twists and curves to the casing unit. In addition to mixing the product, these subsequent conveying methods also remove any excess water remaining from the drying-tunnel.



NEXT cans go through the tunnel can-drying unit (rear), then move (left) to automatic net weigher and onto the elevator that proceeds to casing.

The Standard-Knapp can-caser automatically packs 24 cans into a case and the top of the case is automatically glued, then sealed. At the end of the line filled cases are again placed on pallets and moved by lift-truck to storage. All cans and cases are date-stamped so that the product may be chronologically marketed.

Making the Syrups

White Rock flavor syrups are prepared under most rigid sanitary conditions. Only sterile liquid sugar is metered to the mixing tanks, where the proper amounts of flavor, fruit acids, and caramel are added. Blended with sterile water to the correct brix, the syrup is passed through a stainless steel flash pasteurizer and cooler and then stored in stainless storage tanks. Syrups move from storage tanks to the syrup filler through stainless, sanitary type rotary pumps and piping.

Water, used to make carbonated water, is treated in an Infilco continuous flocculation unit. It is highly chlorinated to burn up any algae and other organisms that might effect beverage quality. All impurities are settled-out, with the clear, sterile, chlorinated water decanted through a sand filter for rough polishing, and then through an activated carbon filter to completely de-chlorinate the water. Finally, it is burnished through several layers of pure white filter paper and then pumped to the Mojonnier Carbo-Cooler to be carbonated.

Canning of soft drinks must be carried out under as nearly aseptic conditions as possible. So sanitary procedures are strict, both before and after operating the canning line.

Aware that the canning of soft drinks is no sinecure, since very little research can be done without commercial production, the company is carrying along a research program in conjunction with production. A quality control program has been instituted. Random samples of all cans entering the plant are subjected to chemical and physical tests. Pre-syruping at high speeds being unique in this new field, the accuracy of syrup throws are rigidly controlled by weighing to the nearest gram.

Gas volume, in-can temperature, and the correct fill of cans are closely checked by means of a special apparatus. The hermetically sealed can lids are checked with micrometers to 1/1,000 in. Since air may be a factor in shelf life of the product, cans are checked for air content. Bacteriological analyses are made of water, syrup, and product at regular intervals.

Large samples are taken from each day's production. These are divided, with one-half being stored in a room held at 100 deg. F. and the other half at room temperature. Periodically, these samples are examined for flavor, signs of can failure, gas volume, and air content. Results of these studies, which will continue indefinitely, are relayed to Pacific Can Co., and panel discussions on major factors are set up. All products are subjected to a quality control program. There are consumer taste checks and uniformity tests.

The White Rock Corp., of Waukesha, Wis., has long enjoyed the prestige of bottling one of the finest carbonated, natural spring waters. In 1944, when National Distillers Products Corp. purchased this company, the idea was conceived that if the basic minerals natural to this spring water could be reconstituted into scientifically prepared, treated water, acting as a carrier for these minerals, the product could be sold as sparkling water at competitive prices. The White Rock Bottlers Co., of Los Angeles was formed for franchise operation under the parent corporation.

After considerable research, White Rock sparkling water, ginger ale, and flavors were put on the California market in 1946. Despite a comparatively late entry in this market, the new company has won a forefront niche.

Always searching for new products, the company felt that a good quality carbonated cherry drink would meet with consumer acceptance. This led to the development of White Rock True Fruit Black Cherry flavor, which has built high consumer demand.

Approximately a year ago, the company recognized that dietetic soft drinks were being successfully marketed in some areas. Being quality minded, the company decided first to experimment with the new sweetening agent, sucaryl calcium (Abbotts). This resulted in the development of a new line of products—"Dietonic" Cola, Root Beer, Lemon Lime, and Ginger flavors, packed in 16-oz., one-way bottles. These new products of our company contain no sugar and less than 9 calories in each bottle, yet they still have the same full flavor and body of our products made with liquid sugar.

ONE OF MANY tests: Gaging of carbon dioxide volume and air content in filled cans.

9 TIPS ON KEEPING

Power-sapping troublemakers sharply exposed . . . How

JUST BECAUSE your electric motors are among the most efficient machines known today and hence will operate with a minimum of attention —is no reason for seeing how close you can come to that minimum.

Remember: When the motor fails, production stops. And that hurts. So the logical procedure is systematic care, which pays off by further reducing failures and consistently lowering repair costs.

To give even inexperienced workers a quick understanding of the principles of motor care, Allis-Chalmers Mfg. Co., Milwaukee, has turned out a most lucid booklet, *A Guide to Care of Electric Motors*. This publication puts a direct finger on your motors' "natural enemies."

The tips given are applicable to all makes of standard, general-purpose motors, regardless of their age, and they are cogently illustrated with pointed cartoons, a number of which are reproduced here. Here, are the "9 Enemies" and how to meet them.

1—Dust

You say that you wouldn't tolerate anyone deliberately putting sand or dirt into a vital plant motor. But—the fact is you do just that every day.

The culprit is Old Mother Nature. And unfortunately she's a steady worker, on the job every hour. Her weapon is dust—which can be minute particles of numerous substances. She just keeps settling it on motor housings, windings, slip rings, and commutators. It will get to the bearings. Give it time, pal—just give it time.

Permit it to collect on the windings and you'll have a fine insulation blanket confining heat until it may reach dangerous temperatures. Then, too, it will plug ventilation spaces and further interfere with proper cooling.

Allow dust to gather on slip rings and commutators and it multiplies wear, also blocks full passage of current by acting as an abrasive and insulator.

Even more serious, let it accumulate and fill up the open spaces in the windings, then the whole wound-section acts like a sponge soaking up moisture, oil, acid fumes.

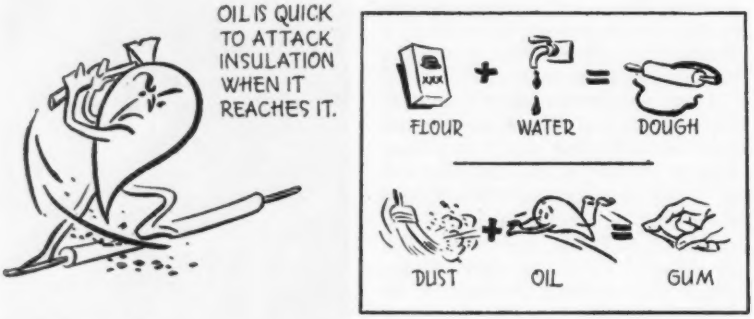
How to Fight Dust

Dust removal is easy. Simply wipe it off. Here, the key to preventive maintenance lies in the timing. Dust in motors should be caught before it has a chance to unite with water or oil.

Thus motors should be carefully wiped on regular inspections—their housings, slip rings, commutators. And occasionally the dust should be blown out of the wound sections with clean, dry, low-pressure (not over 40 psi.) air.

To protect the bearings against dust, see that oil filter caps are always closed.

Carefully check seals and gaskets, replacing those that are worn. Burned out bearings are a lot tougher to replace than seals.



2—Stray Oil

Oil kept in its proper place fights hard on your side. But, when it strays, you've got a real trouble-maker.

Inside bearings—where it belongs—oil fights friction and is often called the "lifeblood" of motors. But outside, such stray oil is strictly poison.

When dust (No. 1) and stray oil (No. 2) get together they form a sticky team. Such stuff catches dust. Good commutation is impossible when it covers a commutator. Brush faces become glazed and packed with dust, resulting in harmful sparking.

The mica insulation segments between bars of the commutator are deteriorated by stray oil. It's even more harmful to insulation on windings. A winding thoroughly soaked with oil puts a motor in immediate danger of a burn out or breakdown.

It's most harmful when this 1-2 team gets in the windings. It forms a greasy, gummy mess that smothers ventilation. It catches and holds any

MOTORS HUMMING

to attack them revealed . . . Defensive tactics highlighted

SOMETIMES A MOTOR NEEDS A BATH!

metallic dust present, setting up a constant threat of shorting or grounding.

What to Do About It

If oil and dust have been allowed to build up, remove them with the aid of a non-flammable solvent, such as tetrachloride. Be careful not to harm the insulation if brushes or scrapers are used.

Go easy on the solvent, too. Do not soak the insulation, for that may have a softening effect. When thoroughly cleaned, dry the windings and apply insulation varnish.

Oil, in mist form, may exist in some plants. To keep it away from motors may be impossible. In these cases, oil which lands on the outside should be wiped off before it can travel inside.

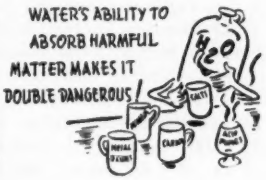
Never lubricate sleeve bearings

KEEP OIL WHERE IT BELONGS!

equipped with oil rings when the motor is running. The true oil level is not indicated, since some oil is riding the ring above the level. Overfilling and escape of oil may then follow.

At regular intervals check the tightness of oil seals, well covers, and plugs.

1. WHEN DRY, INSULATION HANDLES VOLTAGE EASILY. 2. BUT LET IT GET SOAKED.... 3. VOLTAGE MAY BE TOO MUCH FOR IT TO HOLD!



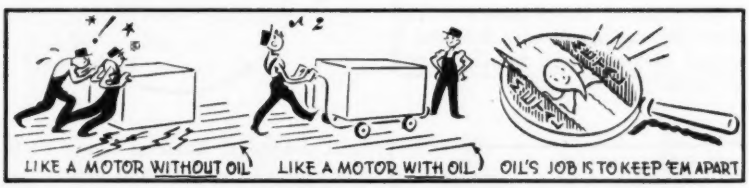
3—Moisture

The ideal motor locale is unquestionably a dry place. To keep motors completely dry in many installations is impossible. But it should be the main target of effective maintenance.

If unattainable, then—for two good reasons—get rid of moisture lodged in the motor as soon as possible.

First, because moisture can eventually soak and soften insulation, it is pertinent to remove it before the damage is done.

Second, when moisture first condenses it forms pure water. In this form it is least dangerous. The longer it stays within the motor, the more time it has to absorb harmful compounds and become a destructive agent.



4—Friction

In theory, wear is eliminated if bearing surfaces are smooth and properly lubricated. Metal-to-metal contact is avoided by a film of oil.

In practice, harmful conditions may be caused by any one of the following factors: Not enough oil, wrong oil, presence of grit, excessive loading. One of the main jobs of motor maintenance is preventing these conditions.

Adherence to the motor maker's lubrication instructions, on the type and grade of oil and the frequencies of application, is of prime importance in fighting friction.

Oil is the lowest item of operating expense. Misused, or use missed, and you have an invitation to trouble and expense. Eliminate guesswork. Use the best quality and the proper grade required for each individual motor. If in doubt on any point, write the motor manufacturer.

With sleeve bearings, see that the oil ring is free and turning with the shaft. Flush out and refill oil reservoir at regular intervals. Check seals.

Where ball or roller (anti-friction) bearings are used, remember, that grease guards against corrosion—not friction. Heat and friction can result from too much grease.

Avoid extra tension in belt and chain drives. Excess loading breaks the thin film of oil, resulting in metal-to-metal rubbing and bearing failure—all in seconds.

5—Misalignment

A free-for-all among the three elements—motor, drive, and machine—is started by misalignment. Bending, breaking, or excessive wear must result. In this tussle, all three elements are vulnerable—and one must "give". The only question is: Which one will go first?

Motor damages commonly caused by misalignment are: Sprung or broken shafts, burned out bearings, overload failure.

All misalignment does not necessarily stem from the original installation. Other factors—foundation settlement, heavy floor loading, excessive bearing wear—can throw the assembly out of line.

Misalignment may even exist when

the motor and machine are mounted on a common, rigid base. The base itself may be mounted off-level, leading to a warp.

Spur gears tend to push apart. In time, this can disturb alignment. "Hold that line" is a must in motor maintenance.

Corrective Measures

Sometimes misalignment gives a warning, such as excessive temperature, increased vibration, rapid knocking. Heat may indicate that misalignment is causing bearing or motor overload. The knock may be a tip that a shoulder of the shaft is being driven against the end of a bearing.

This latter condition, if the installation is not too heavy, may be corrected as follows: While the unit is in operation, loosen the mounting bolts of the motor (or machine) and experiment with variations in position. Corrective guide is the change in degree of noise or vibration until the unit is in line and the symptom disappears.

To correct an off-level motor condition, place shims under the legs until the units are in line.

Excessive tension in the transmission member—belt or chain—falls under the broad heading of misalignment. Here, too, something has to give. The drive itself will suffer accelerated wear, or bearings of the motor or machine will be damaged. Tension should not exceed adequacy.

6—Vibration

The life can be virtually shaken out of a motor by the destructive force of vibration. Misalignment, as previously mentioned, is one of the major causes of vibration. But, there are others, too.

Vibration in the driven machine can be transferred to the motor even though the alignment is perfect. Avoid careless servicing, it can put rotors out of balance and permit mounting bolts to work loose. Wear in bearings can progress to the point of allowing shaft oscillation of considerable amplitude. Vibration can shake motor parts and electrical connections loose. Further, it can crystallize metal and multiply frictional wear.

The source of excessive vibration should be traced down and the cause removed. Unless otherwise indicated, check points in the following order:

(1) Tighten mounting bolts.

(2) Examine motor for loose parts.

(3) Compare foundation with that of non-vibrating motors.

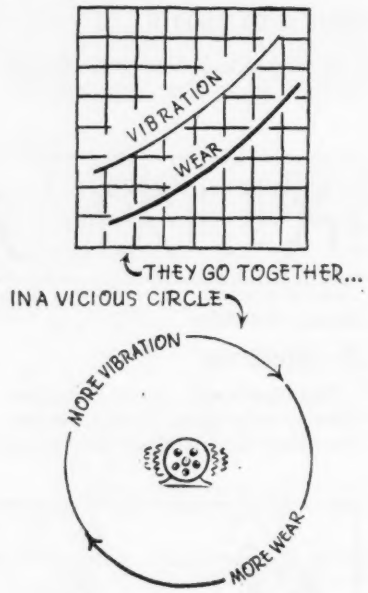
(4) Check bearings for looseness. In general, allow .002-in. clearance—plus .001 in. for each inch or fraction of an inch of journal diameter.

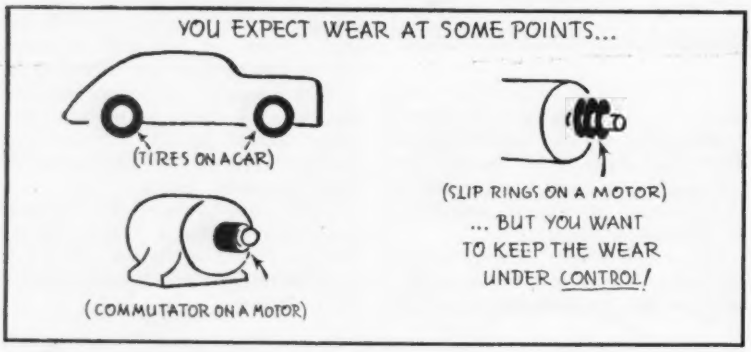
(5) Free motor from driven machine. When disconnected, if motor operates much smoother, then examine driven machine.

(6) If trouble seems to tie back to date of repair, check rotor for balance—dynamic, if possible; otherwise static.

At point of imbalance, just capscrew the needed weight, hooking it around part of motor to relieve pull on screw.

To eliminate vibration is not always easy. But every action taken against it helps maintain a motor.




YOU EXPECT WEAR AT SOME POINTS...
(TIRES ON A CAR)
(COMMUTATOR ON A MOTOR)
(SLIP RINGS ON A MOTOR)
... BUT YOU WANT TO KEEP THE WEAR UNDER CONTROL!

7—Uneven Wear

Slip rings and commutators of electric motors are rotating parts subject to constant friction. Since they cannot be lubricated with petroleum products, wear is inevitable.

Wear is minimized if grooving (narrow ruts) is prevented. Remember how switching tires around on your car keeps tread wear even and extends service. So, too, with commutators and slip rings. Wear is slower when the action is smooth and even.

Dust, as explained earlier, is an abrasive and should be wiped off at regular intervals. Surfaces should be kept free of oil films, since they catch dust and also prevent proper brush contact.

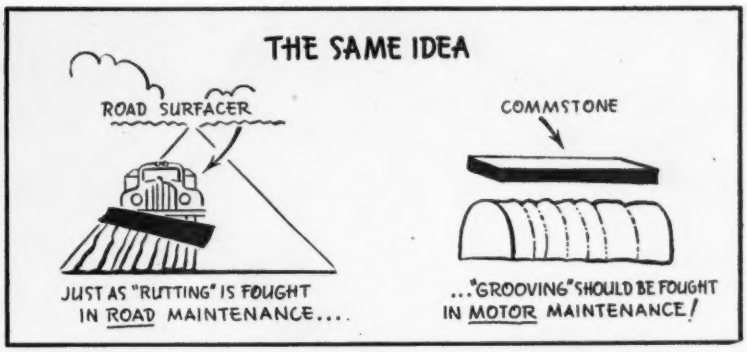
Grooving, pitting, sparking, and accelerated wear all can result from rough and uneven ring and commutator surfaces. This condition should be remedied at the first possible opportunity.

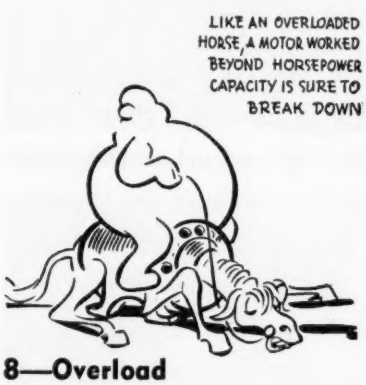
Running the rotor in its own bearings at normal speed often helps to smooth a surface. Removal of rotor, commutator, or slip rings is unnecessary after use of a Commstone (commutator grind stone) in a suitable holder.

To forestall excessive brush wear

and sparking, the mica, separating bars, should always be undercut a depth of about $\frac{1}{32}$ in. Brushes worn unevenly should be trued or replaced with a new set before they can damage slip rings or commutator. For maximum smooth contact, new brushes should be "sanded-in" to the proper arc.

Wear is spread over a wider area and kept more even if a motor with sleeve bearings and belt drive oscillates (shaft floats back and forth axially).


THE SAME IDEA
ROAD SURFACER
COMMSTONE
JUST AS "RUTTING" IS FOUGHT IN ROAD MAINTENANCE....
..."GROOVING" SHOULD BE FOUGHT IN MOTOR MAINTENANCE!



8—Overload

Any good and faithful worker—a man, a horse, or an electrical motor—will finally collapse if you keep adding to his or its load until you pass the breaking point.

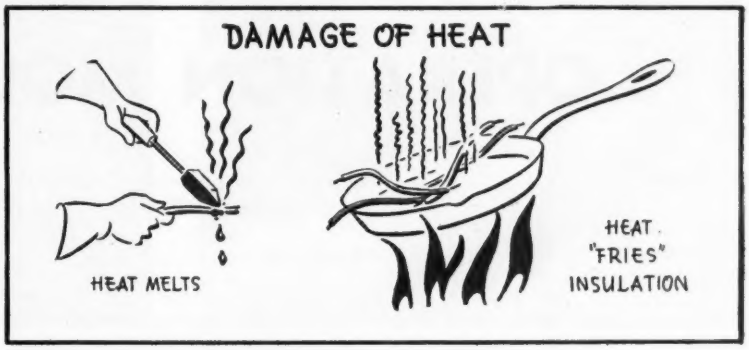
An overload causes a motor to heat up and eventually break down or burn out. True, motor manufacturers rate the capacity of their motors below the breaking point. This practice is sound. It provides a safety factor which should never be narrowed by deliberate "loading up."

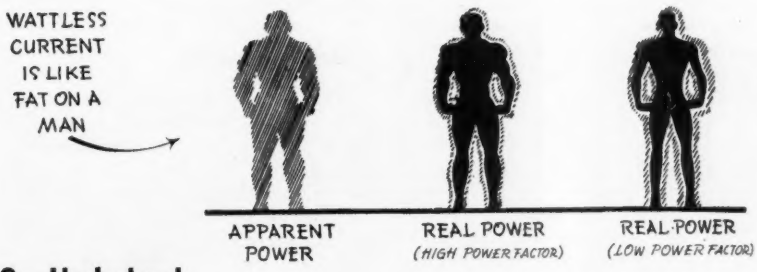
Overloading is not always intentional. It can be produced accidentally—an error in application, an obstruction, excessive friction, or some well-meaning effort to get a greater output from the driven machine.

Any one of these conditions can cause current in a motor to exceed its nameplate rating. The heat may rise as much as the square of the current increase. "Fried" insulation, melted soldered connections, burned out bearings, any one or *all* can result.

Motors are given various forms of "overload protection" as safeguards. Most common is a thermal element connected in the power circuit to the motor. An overload relay, operated by heat from the element, opens the circuit to the motor. Whether thermal element or common fuse, the protective unit employed should be of the proper code capacity.

Never employ a unit that exceeds this recommended value. This is Rule No. 1 to protect the motor. Rule No. 2 is to guard against conditions that trip or blow overload devices. Difference between rules: The motor costs more than the fuse and is a lot tougher to get.





9—Underload

Inefficiency plagues underloading.

Total current flowing in an a.c. circuit is comprised of two compoments—"real power" and "wattless current". The former produces mechanical energy; the latter, merely the magnetic field required.

A characteristic of an induction motor working under only partial load is to change the proportion of the two components in the total power. Real power shrinks; wattless current grows. The "power factor" (ratio of real to total) is lowered.

Quality of the total power is of major importance. A low power factor here has four disadvantages:

(1) Higher line losses; higher voltage drop. Motors lose torque.

(2) Increased load on utilities lines and equipment, inviting breakdowns.

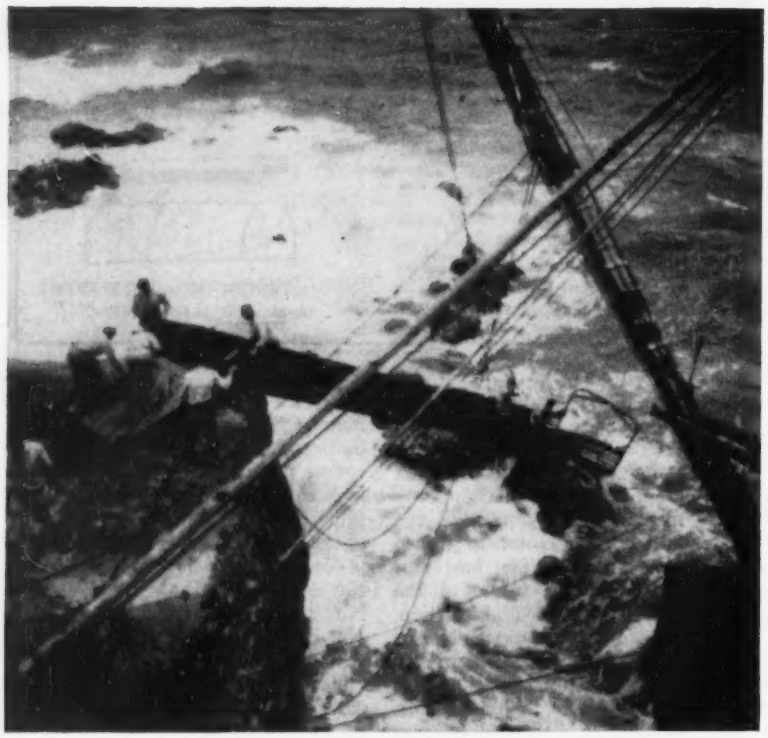
(3) Higher energy cost.

(4) Overheated motors due to excessive currents set up by the high proportion of wattless current.

To correct, first list actual load and rated capacity of each motor.

In a consistently over-motored plant, most motors (except the largest) may possibly be advanced to heavier jobs, while replacing the smallest with even smaller ones properly rated. Once the facts are assembled and organized, juggling of equipment for higher efficiency may proceed.

The preventive way of improving power factor entails minimizing underload. Increased use of synchronous condensers, synchronous motors, and capacitors are corrective measures. Improving the power factor provides more satisfactory production power and other benefits in efficiency.



1—Steel chute is lowered, then is bolted to rock

It can be mighty tough: No harbor. No wharf. Just a tugboat, a hoseline, and orders to load the tanker. But "weather or no," the men get the task done regularly on schedule in—

OPERATION MOLASSES

FE STAFF

Here's a sea story that's full of drama—despite the fact that not a shot is fired, no pirates hang from the yardarm, and not a single ship races under forced draft to the rescue.

Instead, it's the tale of a hazardous materials handling operation not at all commonplace in the food industry—an account of the journey of 11,200 tons of cane-sugar molasses to a ship moored only 600 ft. off the cliffs of the island of Hawaii.

The point is that the operation is not always blessed with fair weather. When these pictures were taken, a 25-mph. wind was blowing and a fairly heavy sea running – meaning rough duty. Strong ocean currents sweep past the island's windy, northern coast. And huge ground swells tear at the shore-to-ship connecting hose, threatening to snap it.

This molasses loading station is part of the layout of Honokaa Sugar Co. on this north coast of Hawaii (called the "Scotch Coast" for its many people of Scottish ancestry). Several times each year the tanker calls at this point and an experienced crew loads it. The equipment needed is quite different from that usually used in the handling of food byproducts.

Rocky Job

Everything but the crane is stowed away in sheds on the cliffside, to be brought out when the tanker arrives. The first step in "Operation Molasses" is to lower the metal chute from the edge of the cliff to a spray-covered rock jutting up from the water. The bottom end is bolted to a concrete footing on the rock and the top is fixed to its foundation. The chute protects the specially built hose from the rocky cliff and serves to guide the line into the sea.

The 18-ft. tug *Honokaa* is then lifted from its cradle atop the cliff by the boom and lowered into the foaming water. Its Hawaiian crew tow the lead line out to the tanker. And this line is made secure from shore to ship. Now the big hose—its forward end capped to keep out sea water—is secured to the end of the line, whereupon a windlass aboard the tanker snakes the hose down the chute and out toward the ship.

The hose, a specially built 8-in. Pioneer Industrial Rubber Co. product, is the vital link of this materials handling operation. It is fabricated in 25 ft. lengths (all hand-made) with built-in nipples and flanges. These lengths are tightly bolted together to form the liquid-flow bridge.

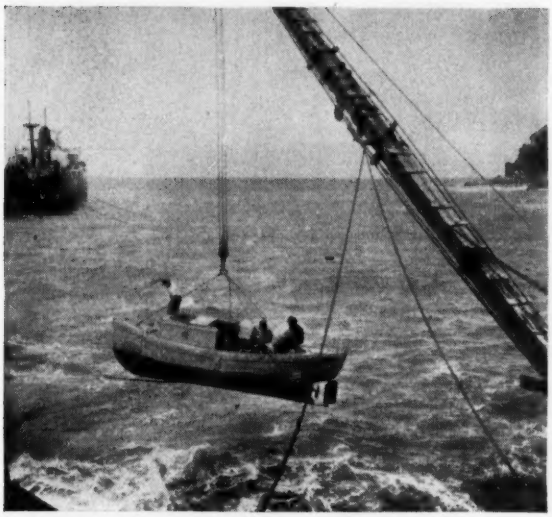
Steel drums are attached by chains to fittings on the hose at 8-ft. intervals (3 drums per hose length) to keep the hose afloat.

Transfer Underway

Out on the fantail of the tanker, the windlass finishes drawing in the lead line and then the hose. Ashore, the hose is connected to the feed outlet, and aboard, to the ship's tanks.

Thirty-four hours from the start of the operation, the job is done. A shipload of 11,200 tons of molasses—1,915,200 gal. — has been pumped from the Honokaa molasses plant into the rolling tanker.

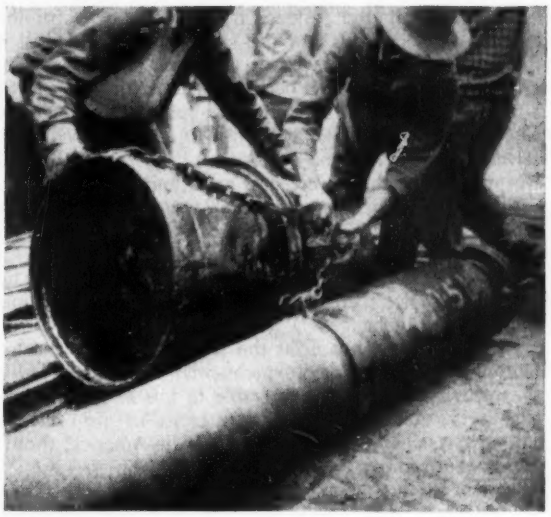
After each operation the hose is flushed clean with water. Along with the lead line, it is then drawn ashore by winch and stored again in sheds until the next call of the ship. The chute and drums are returned to the cliff top, and the *Honokaa* is hoisted to its cradle ashore.



2—Tugboat is launched by crane

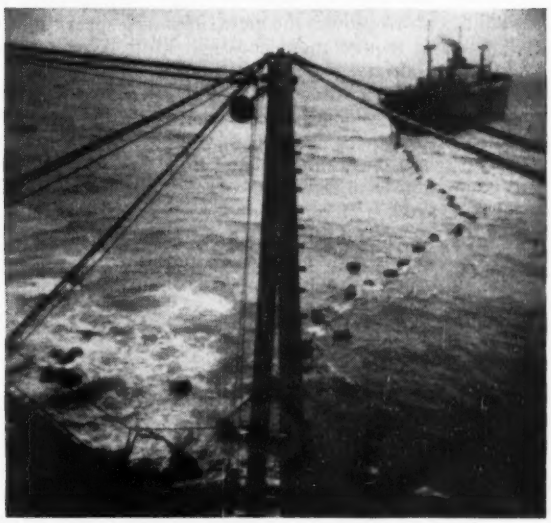
3—And it tows lead line out to tanker

4—Line fastened to hose. Pull-out begins



5—Drum-floats go on hose

6—Hose chutes down into the sea



7—Line complete, molasses flows to ship

BETTER RICE FOR THE WORLD

Begun in Bataan, addition of vitamins to grains by coating technique is spreading against obstacles. Significance to millers interpreted

ROBERT R. WILLIAMS

Chairman, Williams-Waterman Fund for Combat of Dietary Diseases, Research Corporation, New York

Within a year after enriched rice began to be distributed through the rice mills and rice shops of the east coast of Bataan, the 63,000 people of that area showed a sharp improvement in health (*Food Industries*, Nov. '48, p. 96).

Beriberi symptoms had previously affected 13% of the 12,000 persons individually examined. After they had received enriched rice for a year, only 1.5% showed such symptoms, and these were only mild and residual.

Similarly, the beriberi deaths fell progressively from 165 for this area until—during April to October, 1950—not one beriberi death was reported.

On the west coast of Bataan, where the people did not get enriched rice, beriberi symptoms and deaths remained substantially unchanged.

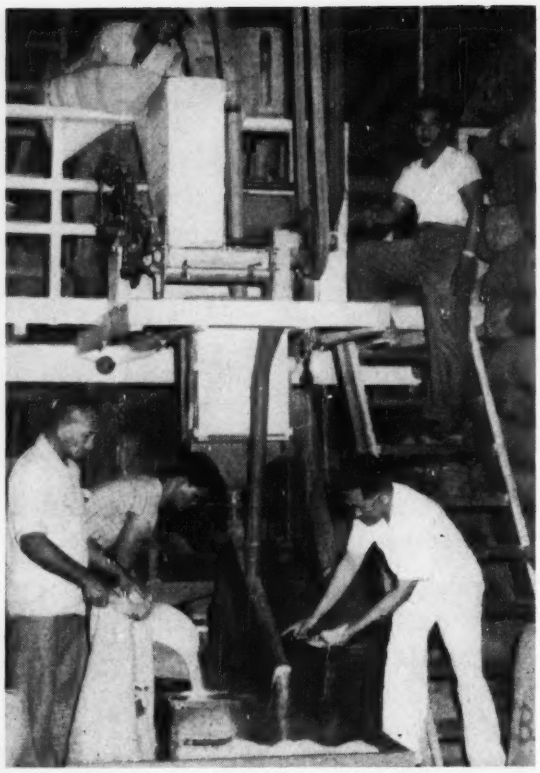
As important, perhaps, as the saving of lives is the fact that 7,500 people in the experimental area were freed of a hampering illness and were able to live and work more effectively. A similar opportunity exists in most of rice-eating Asia. There is need also in Latin-America, though in less acute form.

One of the most encouraging features of the experiment was the ease with which the new rice was introduced. Nobody objected, for the rice tasted the same as it always had. This is a big advantage over rice "conversion" or parboiling, which yellows the grain, imparts a special flavor, and makes it require more cooking. Most Asians, other than Indians, do not like parboiled rice.

Enrichment by coating also has an advantage over the simplest of all possible expedients, that of leaving a portion of the bran on the grain. Again most Asians like their rice white, and one cannot blame them, especially if the rice is not freshly milled. The bran on the grain quickly turns rancid in a tropical climate, and it attracts swarms of weevils in storage and transportation. Nobody likes to pick weevils out of his daily food. This problem is aggravated by the progressive urbanization and industrialization of the Orient.

Vitamin-Coating Processes

There are now two processes for the enrichment of rice by coating—one developed by Hoffmann-La Roche, Inc., and one by Merck & Co., Inc. Both depend on the principle of applying a high concentration of vitamins on the surface of rice grains, enveloping these vitaminized grains in a coating of edible film-forming substance, and finally coating their surfaces with a white powder of harmless mineral nature which contributes to nutritional value. The film coating is necessary to avoid loss of the vitamins when the rice is washed before cooking.



BATAAN MILL enriches rice by incorporating premix. Equipment is simple, cost low. Dr. Juan Salcedo, Jr. (bottom, right) has extended use of enriched rice in Luzon. He was Philippine Secretary of Health, 1951-1953.

In both processes, the highly vitaminized grains constitute a premix which is prepared in a central factory under careful chemical control. The premix then goes to the rice mill, where 1 lb. of it is mixed with 200 lb. of ordinary white rice. The resulting enriched or fortified mixture is ready for sale to the consumer. The economy of treating only ½% of the grains is obvious. The mixing of premix with rice at the mill is readily carried out without specially trained supervision.

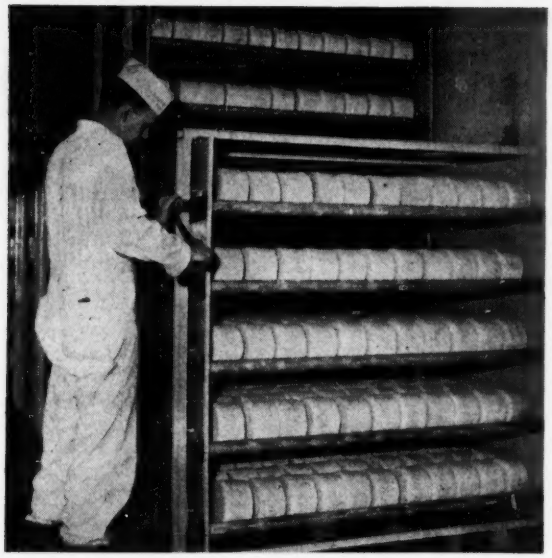
The older process, that of Hoffmann-La Roche, is the one which was used in Bataan, the premix being manufactured in Manila for the purpose. There also are factories using this process at Crowley, La.; Sacramento, Calif.; and Singapore; Bangkok, Thailand; and Osaka, Japan.

Ideally, the premix formulation should be adapated to the needs of the population to be served. Within a wide range, the formulation is adjustable to such needs. Up to the present, all fortified rice which has been used on a substantial scale has included thiamine, niacin, and iron at the same levels as enriched flour. Riboflavin has not been included because of the difficulty of masking the yellow color which riboflavin imparts to the premix grains.

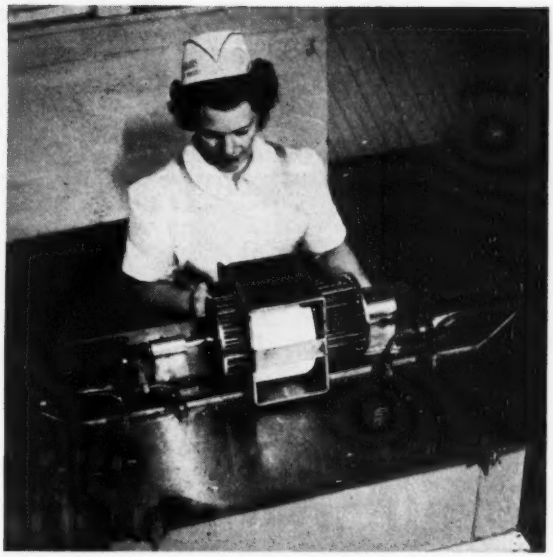
This difficulty has been overcome in one of the existing processes and can doubtless be met by adaptation of the other. Enriched rice now may fully conform to enriched flour in standard.

Other vitamins and minerals can presumably be added where the populations require them. Even amino acids can be considered where milk and meat consumption is low. But most of these refinements are matters for the distant

(Turn to page 174)



SPECIALLY DESIGNED RACKS with pipe shelves enable one man to turn 14,000 cheeses per hour.



AIR OPERATED UNIT, comprising two plates with 50 needles on each, perforates 5-lb. cheese in one motion.

Modernizing Step Type Cuts Cheese Costs

Program featuring advanced practices and new equipment pays off before final completion. Labor, process costs, losses down. Quality up

VINCENT N. SMITH
Production Manager, Langlois Cheese Makers, Langlois, Ore.

A few years ago, obsolescence—inevitable like death and taxes—began squeezing our net profits between high production costs and limited output. We no longer could ignore the need for plant modernization.

Study of our plant operations showed that advanced practices could: (1) Lower processing costs; (2) improve uniformity of product quality; (3) increase the space of total work area; (4) up capacity, and (5) better our process so as to obtain a more complete recovery of milk.

To accomplish these five points we developed a program based on an analysis of our unit operations made obsolete by the swift advance of mechanization. And first efforts have been directed toward modernizing our process and improving materials handling.

▶ **It being necessary to continue production during this transition, the modernizing was designed as a stepwise program. Overall savings from the program are not yet fully realized since it is only about 50% in effect. However, invention and adoption of new equipment have, to date, resulted in startling reductions in labor and processing costs and marked improvements in product quality.**

But first, let's consider the conventional blue vein cheese process. For with an understanding of old methods our progress can be better evaluated.

Literature records considerable variations in manufacturing methods for the several types of blue cheeses—Roquefort, Gorgonzola, and Stilton. Whole milk, which may or may not be homogenized, is used. Temperatures employed vary sharply, depending on type of milk available and the individual cheese-making methods. A lactic acid bacterial culture, the only species necessary in blue vein cheese, is first added to the milk in amounts varying from 1½ to 4%. Then the milk is coagulated with rennet and, after a time period, the curd is cut.

Spores of *Penicillium roqueforti* are added, either directly to the milk before coagulation, or by sprinkling over the curd before or at the time of hooping. These spores are responsible for the mottling, or blue vein, effect.

Hooped cheeses are then moved to draining tables, where they are manually turned, at intervals, to facilitate whey drainage. During this period, the lactic acid bacteria continue to produce acid, thus aiding greatly in retarding growth of undesirable foreign organisms.

When the cheese has become firm, usually the following morning, hoops are removed and each cheese is salted individually. This may be done in a brine tank or by a sprinkling-rubbing method. The period of time required for salting depends upon the salt content desired in the finished product. Following this period the cheese is perforated or punched.

"A Major Impediment

—to progress in blue cheese making has been the ultra-conservative adherence to traditional ways and means.

"The sticklers have long contended that 'quality demands that we retain certain manual operations.'

"Today, however, new facts are refuting this argument. And so production-limiting, profit-pinching practices are finally being pushed back."—*V. N. S.*

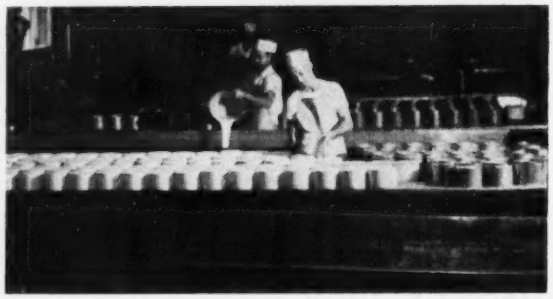
Key Operations in Blue Cheese Process

CURD is dipped from vat, placed in perforated cradle to drain, then hand-packed in stainless hoops.

AS HOOPS are turned (every 30 min.) they are bounced on table to speed whey drainage through perforations.

Some cheese-makers perforate each cheese from both sides; others punch completely through it from one side. Air enters through these apertures, aiding the mold spores to germinate and grow throughout the cheese. Any excess gases, such as CO_2, may escape through these holes.

Curing is done in caves or rooms having temperatures of 45-55 deg. F. and relative humidity of 85-95%. Length of time required for curing depends on various factors, such as the type of milk used; homogenization, if any; temperature and relative humidity maintained; and desired characteristics of final product. Normally, the curing period ranges from 3 to 12 months.



NEXT MORNING hoops are removed from cheeses (foreground). Starters are added to vats of milk (rear).

Plant Improvements

Many traditional process and material handling methods, inherited by blue-cheese makers, clung for years to Langlois' operations. But adoption and invention of new equipment here to date, resulted in potential reductions in labor and processing costs and marked improvements in product quality. These advances will be taken up here in the sequence of normal unit operations rather than as they were chronologically installed in the line.

The old system of milk receiving was an inefficient hand operation requiring the full time of two men. The 10-gal. cans were dumped into a double tank in which the milk was weighed. This station was inside the cheese make-room—an unfavorable location from the standpoint of cleanliness. Then empty cans had to be moved to a separate building, some 45 ft. distant, where they were washed in a rotary can washer.

For improved efficiency and sanitation, two separate rooms were constructed, one for milk receiving-can washing, the other for milk processing. Before each day's operation, all processing units are sanitized with 190 deg. F. water and with a 100 ppm. NaOCl solution.

Only one man is required to operate the recently installed automatic weigh-tank and straight-line washer (6 cans per min.). Today, each can is handled only once, as compared to four times with the old system. The new arrangement has speeded milk receiving, permits the operator to handle more milk and also to work at additional duties in the plant after daily receipts are in.

A representative sample of each producer's milk delivery is taken for butterfat analysis and to determine payment for the milk. Resazurin and sediment tests also are made at regular intervals.

Milk processing is now an automatic operation requiring practically no attention. This compact line is arranged with sufficient space for mechanical adjustments and for sanitary procedures.

The whole Jersey milk now moves smoothly and swiftly from delivery trucks through weighing and sampling to a 200-gal. stainless holding tank in the processing room. It is pumped from this tank through a tubular heat exchanger, where its temperature is raised to approximately 85-95 deg. F. to facilitate cream separation. The separated cream is first pumped to a holding tank and thence through an homogenizer and back into the main pipe line, where it is combined with the skim milk to form whole milk that flows to the 6,000 lb. cheese vats.

Cream homogenization creates a larger butterfat surface area for chemical activity during curing of the cheese. It also has a significant effect upon the flavor of the cheese.

To date there have been no modern mechanical improvements in cheese make-room operations. This is largely because of the nature of this process in which milk is transformed into curd.

When a vat is filled with milk the first step in the cheese-making process is addition of a pure culture of *Streptococcus lactis*. These organisms utilize the milk sugar and break it down chemically to lactic acid. Mother

cultures are prepared in a separate laboratory, isolated from the plant. Batch, or vat, cultures are prepared in a specially constructed room inside the plant, but isolated from the processing and manufacturing rooms. Primarily, these isolation procedures are sanitary measures to guard against high incidence of bacteriophage, a virus which can cause lysis of lactic acid bacteria.

Second step is addition of a pure culture of *Penicillium roqueforti*. This mold is the chief ripening agent in blue vein cheese. It is added to the milk in the form of spores, or powder.

This mold, which is prepared under aseptic techniques, is carefully cultured by the manufacturer on wheat or barley bread cubes. The cubes are then dried and ground, and the powder used for the inoculum.

Milk is thoroughly agitated by manual stirring for uniform distribution of the lactic acid bacteria and mold culture. After desired incubation, and with sufficient acidity developed, rennet is added.

An extract from calves' stomachs, rennet has been standardized for use in the dairy industry. Actual coagulation of the milk is caused by the enzyme rennin. As little as 1 part to 3,000,000 parts of milk acts as a coagulant. Because of its potency, it is diluted with 40 parts cold water and then added directly to the milk. Agitation is then increased to disperse the rennet, and coagulation begins immediately. Soon the entire contents of the vat becomes a solid gelatinous mass.

The renneted milk is now allowed to set. During this time it continues to coagulate and becomes quite firm. Also, the lactic acid bacteria continue to produce acid. On reaching the desired titratable acidity, (usually about 0.12-0.16% acid) and at the point where the cheese-maker finds that the curd will break sharply across his forefinger, the coagulated milk is cut with curd knives into ½-in. cubes.

Upon cutting, whey is immediately expelled from the curd. Individual curds gradually decrease in size and no longer adhere as a mass. Curd is left in the whey until it develops the desired acidity and firmness. It is then dipped from the vat with cheese cloth, and dropped into a stainless steel perforated cradle to drain. After draining, curd is hand-packed into small, stainless, perforated hoops. These are filled on a volumetric basis, and they produce a finished cheese weighing approximately 5 lb.

After hooping, the curds are allowed to drain further and, as this occurs, they knit together to form a solid cheese. The hooped new cheeses are upended once every 30 min. to facilitate whey drainage from both ends. The turning is accomplished by bouncing the hoops in a circular motion on the draining table, so whey may be expelled from the perforated sides of the hoops.

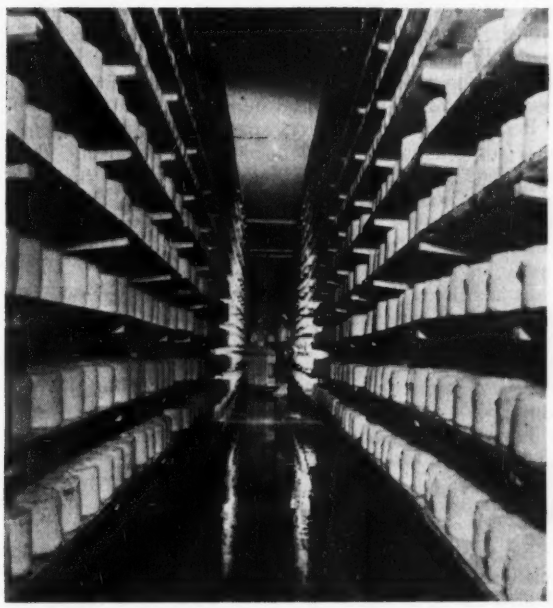
The following morning, hoops are removed and the cheeses are loaded on metal shelves, which are placed on racks and moved, by lift-truck, to the curing room.

NEW CHEESES are moved to curing room. Note metal rack that enables fork-truck handling.

Metal Racks Cut Handling

Manual handling is costly both from labor and breakage standpoints. It also has a detrimental effect upon the quality of the finished product. With the old system, cheeses were handled about 75 separate times, on and off wooden shelves. And, in each instance, two men were required for the laborious transport operation.

With the newly designed, all-metal racks, now moved by a 2,000-lb. electric fork lift-truck, all transporting operations are performed by one man. Cheeses are now manually handled only 10-12 times. In addition, the new racks utilize storage space more efficiently in the curing room, providing much needed increased storage space. Also,



IMPROVEMENT in salting method is demonstrated (left). Metal rack is moved to salting station, cheeses are removed, salted, and replaced. Photo (right) shows manually handled cheese-filled wood shelves.

they have reduced breakage to a minimum and simplified sanitation procedures.

These palletized racks were designed particularly for use in three separate stages of the process in addition to transporting cheese from make-room to curing room and from and to curing room. Three types of removable shelving are used in racks for early curing operations.

Salting and waxing racks are identical in construction. Two kinds of shelving are used for the salting operation—metal trays 5 ft. long by 2¼ ft. wide that hold 32 cheeses or four wooden shelves (each taking 8 cheeses) which combine to form a tray of the same dimensions. The latter type are being discarded as rapidly as new metal trays can be secured.

Racks are fabricated of heavy metal, all welded, 5 ft. long by 5½ ft. high by 2¼ ft. wide. They are designed to be stacked two-high in the curing room. Each rack holds 192 cheeses, placed on flat ends for salting.

Waxed cheese is stored on corrugated, stainless trays, six to the rack. Capacity of racks fitted with this type of shelving is approximately 290 five-pound cheeses.

A specially designed rack is now used for mechanically turning cheeses. It consists of a metal frame identical in size to the other racks. Fixed horizontally within this frame are 25 galvanized pipes (2-in. size) arranged in shelves of five each. Pipes are so spaced that when cheeses are placed on their round sides they fit into the interstices of the pipes, 44 to each shelf, 220 in each rack. Each pipe is connected to a rotating assembly actuated by means of a toothed sprocket and chain. Four rows of cheeses, a complete shelf, are now turned with a simple ratchet.

M-H Advances

Now let's consider the materials handling improvements in process sequence—

In the new make-room method, 192 new cheeses are loaded upright on the shelves of a rack. Then, handled like a pallet by the lift-truck, the filled racks are moved into the curing room. For proper curing conditions this room is maintained at approximately 50 deg. F. with a relative humidity of 90-95%.

In the old method, two men placed the cheeses upright on 7 ft. long wooden boards and these upon mobile racks. Holding a total of 110 cheeses, the racks were then pushed into the curing room and the laden boards or shelves were manually lifted onto supports, fixed to posts. The men, each having a long-handled T-shaped implement, raised loaded shelves to the overhead supports.

For every subsequent processing step this same hazardous (for product) manual operation of removing, then replacing, the laden shelves was necessary. On the basis of 600 cheeses a day this required at least 1½ hr.'s time for two men. But with the new lift-truck operation, man-hours have been cut in half and product breakage significantly reduced.

In addition, sanitizing of wooden shelves and supports is scientifically impossible. After continued use it is even more impossible. One of the new stainless trays, used in racks holding 48 cheeses, may be properly sanitized in the same time that it formerly required to wash—not sanitize—two wooden shelves holding 30 cheeses.

Further, it was difficult to reach the overhead wooden shelf supports for cleaning.

Salting

As compared to some other cheeses, blue vein has a relatively high salt content. Major reasons: To produce desired flavor, to inhibit growth of undesirable organisms, and to aid in expulsion of whey, thus firm the product to desired texture. On the other hand, salt content should not be so high as to affect adversely the free growth of *P. roqueforti*.

Between the 1st and 7th days in the curing room, each cheese is rubbed with coarse flake salt on four consecutive days. Two operators, working first on one side, then the other, of the new racks, remove the cheeses, rub them with salt, then replace them on the shelves and heap salt on top of them.

Salting is still carried out in the traditional manner. However, instead of laborious manual movement of the shelves of cheeses to the salting station this is now done by lift-truck. The new racks, handled by lift-truck, bring approximately 100% labor saving in this transport operation.

Perforating

Following salting and about at the 7th day of age, cheese is again moved from the curing room, lifted from shelves, and semi-automatically perforated.

The new perforator unit operates on compressed air and is actuated by merely pressing a button. A Langlois design, it was fabricated locally. The machine consists of two stainless plates each having 50 3-in. stainless needles. With this unit, the operator places a cheese in the rectangular chamber, presses the button, and the needles punch the cheese first from the right, then from the left.

The electrically operated perforator formerly used was actuated by a foot lever. Cheese first was placed in a stainless band having a handle. By means of this handle, the operator would insert the cheese into the perforator opening and, by tripping the pedal, a plate having 50 needles would perforate one side of the cheese. The cheese would then be removed, turned over, and replaced in the perforator opening to be punched on its other side. A maximum of 260 cheeses an hour could be punched with this unit.

The new unit will handle 480 cheeses an hour. On the basis of 600 cheeses a day, the unit affords labor savings of 30 man-hours a month. (Labor savings in this instance do not include transport to and from the curing room.)

In addition, the old machine was stationary, while the new unit is mobile. It was difficult to sanitize the old unit—all parts were not accessible. But every part of the new machine is of stainless and easily available for cleaning. Sanitation of this unit is imperative since the needles enter all parts of the cheese and could serve as a means of inoculating foreign types of organisms into the product.

Turning Cheese

Immediately after perforating, the week-old cheeses are moved to turning shelves, where they are placed on their rounded sides rather than on end as when salting. From the 8th to the 30th day, each cheese must be turned, about 90 deg. At this stage of curing the cheese is soft and somewhat sticky. If not turned each day, it would adhere to the shelf, be easily broken when next removed, and if left too long without turning may become misshapen.

An average of 14,520 cheeses an hour may be semi-automatically turned on the new racks by one man as compared with but 6,300 an hour by the old manual method. With the new rack, cheeses are not manually handled until washing at 30 days of age. Elimination of handling during this period produces better mold growth because none of the perforations become plugged by hand turning. Also, breakage has been almost completely eliminated.

Using the old method, an operator would walk along the shelves turning all cheeses within reach. A mobile

(*Turn to page 229*)

NEW EQUIPMENT & SUPPLIES

Weighing, Sorting, Statistical Control—Now Automatic

Three production line operations—weighing, sorting, and statistical control—are now all performed automatically by this assembly comprised of the checkweigher (right) and control unit (left).

Selectrol (right) automatically checkweighs each package on conveyor line and classifies and rejects those units which do not meet the allowable weigh limits. In the assembly, checkweigher also furnishes the individual package weight information, in the form of voltage to the new supplementary unit called the Average and Range Computer and Control Indicator and Chart Plotter (left).

Computer calculates the average weight of groups of consecutive packages, compares these averages to statistically determined limits and actuates the control indicator. The calculated average, in the form of voltage, is fed to the average control chart plotter.

Range computer receives individual unit or package weight signals from the checkweigher and calculates difference between the maximum weight unit and minimum weight unit in each group of consecutive packages. If this difference (range) between heaviest and lightest package in a group is larger than pre-set limits, the range control indicator light is illuminated. The range computer provides an indication when the spread, or package weight variation, is larger than normal. A voltage proportional to the variation is fed to the range control chart plotter.

Plotter records, by means of an Easterline-Angus twin chart recorder, the Average X and Range (R) for the weights of every ten consecutive packages as they are checkweighed. Recorder charts are each 4½ in. wide with 50 equal chart divisions (other chart gradations may be obtained). The averages are recorded about a nominal weight value, which is at center of chart. Range (or maximum deviation in sample) is recorded from zero at once edge of chart.

Averages and ranges are recorded while chart is intermittently driven. Thus, record is presented as so many averages and ranges per unit of chart length. Normal number of averages and ranges per in. of chart is about 10 (representing approximately 100 packages). At 10 averages and ranges per in. of chart, and speeds of 100 checkweighings per min, the chart will last for about 20 hr. continuous recording. Recorder has a switch which provides a continuous speed chart drive, if desired. A continuously running chart would provide a production rate as well as an X and R record.

Sensitivity of charts is normally about one division (about .1 in.) per g. This can be adjusted by at least a factor of 2 in either direction. Accuracy is approximately plus or minus 1 g. for averages and plus or minus 2 g. for ranges.

Warning lights for control limits on averages and ranges may be adjusted to operate at any value. Accuracies of settings are same as above, plus or minus 1 g. for averages, 2 g. for ranges.—*Exact Weight Scale Co., 944 W. Fifth Ave., Columbus 81.*

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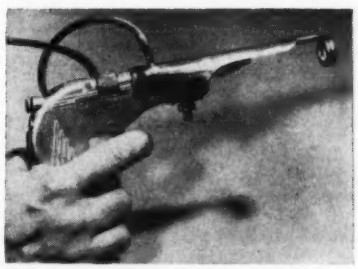

Gases Detected Quickly With Gun Attachment

Presence of halogenated gases (such as refrigerants) in the air can be quickly and easily determined with use of a special attachment, a halide leak detector, on the "Torch-O-Matic" air-acetylene gas gun.

Leak detector attachment is expected to be useful in air conditioning and refrigeration work where halogenated gases are commonly employed.

Attachment consists of a gasketed metal saddle, a two-turn helix of copper rod and a rubber sampling tube.

When saddle is clipped on gun, the venturi effect produced by the acetylene flowing through gun barrel creates a vacuum in sampling tube. Operator places end of tube in air location where gas leak is suspected. Air sample drawn through tube mixes with acetylene and, as latter burns, any halogenated gases present are decomposed.

Products of this decomposition, striking hot copper helix, which is suspended in outer cone of acetylene flame, impart a distinctive color ranging from a faint rose for very small halogen concentrations to an intense blue for the largest.

Speed is indicated by fact that user simply snaps on leak detector and observes a color change indicating presence of gas within one or two seconds after placing sampling tube in vicinity of the suspected source of leakage in equipment.

Laboratory studies with Freon F-12 (dichlorodifluoromethane) show that detector responds dependably to concentrations of as little as 200 ppm. or 0.02 percent by volume.—*Velocity-Power Tool Co.*, 7500 *Thomas Blvd.*, *Pittsburgh* 8, *Pa.*

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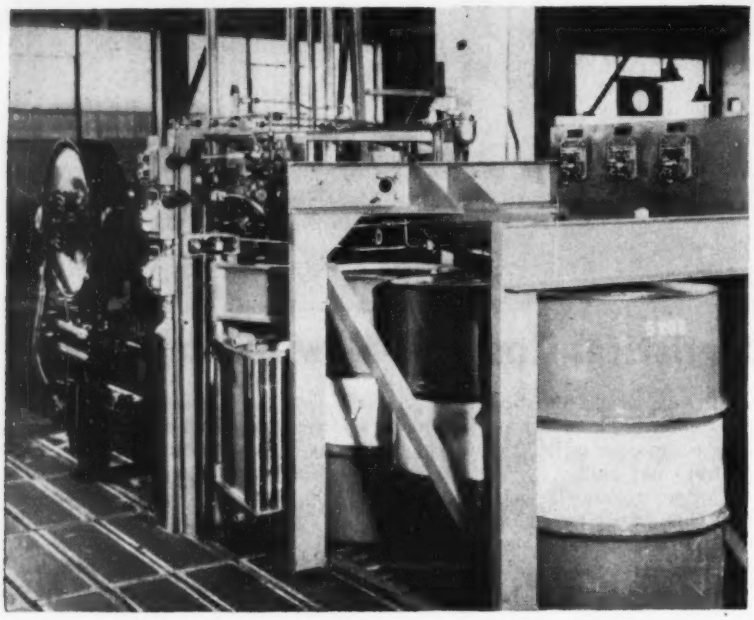

Drums Filled Rapidly With Automatic Unit

In an 8 hr. shift, a single operator can handle 1,000 drums of 53-55 gal. capacity with this automatic filler for oils, syrups, and other liquid food products.

Empty drums are fed to unit by gravity roller conveyor. Filler admits one drum at a time, automatically locates the bung and positions the drum. Wide variations in drum heighths, diameters and bung locations can be accommodated automatically.

A filling lance descends through the open bung, automatically opening the filling valve at bottom of stroke. Filling is done "from the bottom up", with the lance tip submerged to minimize foaming. A dial scale, pre-set to desired net filling weight, automatically compensates for tare weight of drum and provides automatic cut-off when pre-set net weight is reached.

Human error is eliminated and losses due to overfill minimized. The lance then withdraws and a drip pan swings under the tip; drum heads are kept clean and dripped liquid is returned to filling line.

Automatic hydraulic controls operate entire unit; once started, drum filler functions without operator's attention until manually stopped. Complete interlocking of controls provides automatic cut-off if empty drums are not received at unit, or filled drums not moved off delivery conveyor.—*The Rucker Co.*, 4228 *Hollis St.*, *Oakland* 8, *Calif.*

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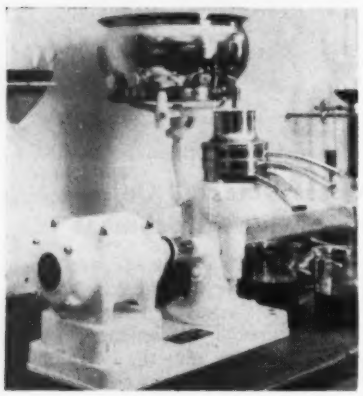

Lab Centrifugal Aids in Production Studies

A new multi-purpose laboratory centrifuge has been introduced for use in food processing laboratories. Machine is equipped with four interchangeable bowls to provide concentration, liquid clarification, solvent extraction, and centrifugal mixing. Bowls can be fitted quickly onto same base.

Small scale preliminary tests by the new unit provide a fundamental evaluation of centrifugal methods at low cost. Results of tests can be used to predict performance of full-size centrifuges of all makes and types. Unit features stainless steel construction of internal parts, simplicity of operation, and easy maintenance.

Machine has a capacity of ¼ to 2 gpm. and operates on ½ hp. at 110, 220 or 440v. It attains a centrifugal speed of up to 12,000 rpm. and a centrifugal force of 7,500 gravities. It is 30 in. high and weighs less than 150 lb.—*Merco Centrifugal Co.*, 150 *Green St.*, *San Francisco* 11.

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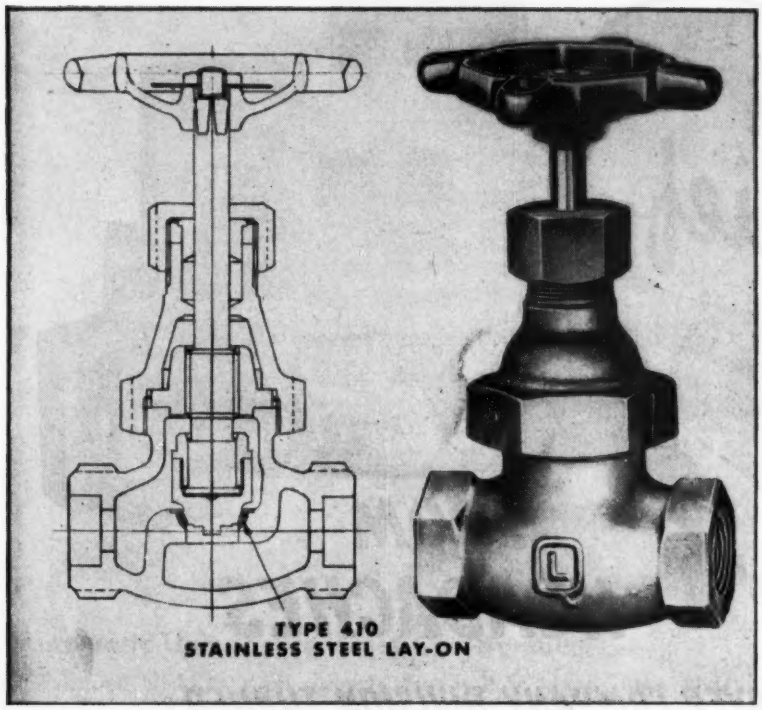

Improvements Eliminate Valve Seat Rings

Two new features, a "full-way" plug type disk with increased seating width and a new chromium stainless steel seat which eliminates conventional seat rings, have been incorporated into the new 600-lb. small steel valves.

Introduction of "full-way" plug type disk into line enables maker to discontinue throttling type seat and disk valve.

New disk, made of Type 420 chromium stainless steel, has a 500 Brinell hardness. Type 420 stainless steel has been a feature of line for years.

The "lay-on" seat, Type 410 chromium stainless steel containing 13 percent chromium, has a 350 Brinell hardness. This accounts for a sharp reduction in errosive action. Elimination of use of seat rings solves ring breakage and ring joint leakage, two primary causes of excessive valve maintenance costs and failures. The combination of these hard metals, prevents disk and seat scoring and at the same time greatly increases valve efficiency and service life. *Lunkenheimer Co., Cincinnati.*

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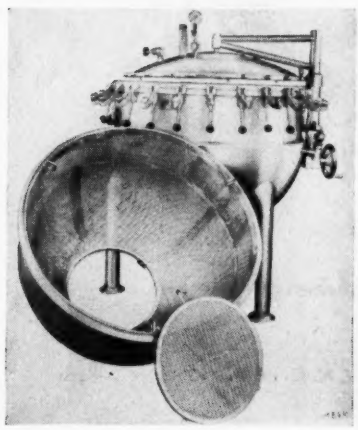

Pressure Cooker Has Full Steam Jacket

This new style pressure cooker has a full "super jacket," heating entire hemisphere of large inner bowl. Jacket is equipped with a new, specially designed steam spreader to give faster heat-up and quicker processing.

Sanitation features include tubular legs with smooth, rounded kettle sockets, adjustable and vermin-repellent floor flanges, and highly polished stainless steel surfaces for quick and easy cleaning.

Available in capacities of 30 to 250 gal., cooker is designed for internal kettle pressures to 15 psi. and steam pressures in jacket to 90 psi. Bronze safety valve is included with steam inlet fittings, and bronze quick-opening gate valve is furnished on bottom outlet.

Silicone-rubber cover gasket retains shape under pressure almost indefinitely, and quick-opening steel latches provide rapid closing and opening. Baskets of heavy gage perforated stainless steel can be furnished.—*Hamilton Copper & Brass Works, 820 State Ave., Cincinnati.*

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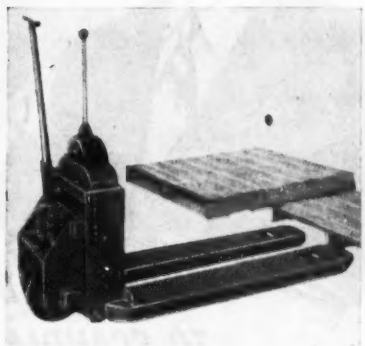


Compact Truck Handles Both Type Pallets

Single or double faced pallets can be handled with the new 2,000 lb. truck.

Length, not including forks, is 13 in. Forks are made from 24 in 72 in. long. Lowered height is 3¼ in. and truck has a full lift of 4 in. Overall width outside of forks is 22 in., width of each fork is 7¼ in. Opening between forks is 7½ in. Tandem wheels, which carry load, are each 3¼ in. dia. by 2 in. face. Wheels are available in aluminum, cushion rubber and plastic.

All four load wheels are equipped with sealed ball-bearings, two bearings per wheel. Load wheels are articulated so that they ride over obstructions with much less effort than single wheels.

Front wheels are 8 in. in dia. by 2 in. face and equipped with roller bearings. They are available in semi-steel, cushion rubber and plastic.

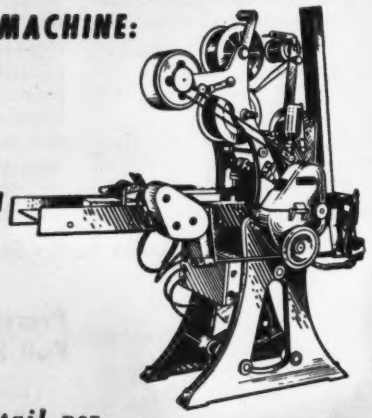
To handle a 2,000 lb. load requires less than a 30 lb. pull on a level hard concrete floor. It also requires less than 25 lb. effort on the lifting handle to raise the load.—*Market Forge Co., Materials Handling Div., 35 Garvey St., Everett 49, Mass.*

Circle 103C on Reader Service Card

FROM HEADACHES

SINCE THE BAYER COMPANY DIVISION TURNED TO SCANDIA AUTOMATIC BUNDLING MACHINES

YOUR PRODUCT, TOO, DESERVES THE BENEFITS OF THE SCANDIA AUTOMATIC BUNDLING MACHINE:



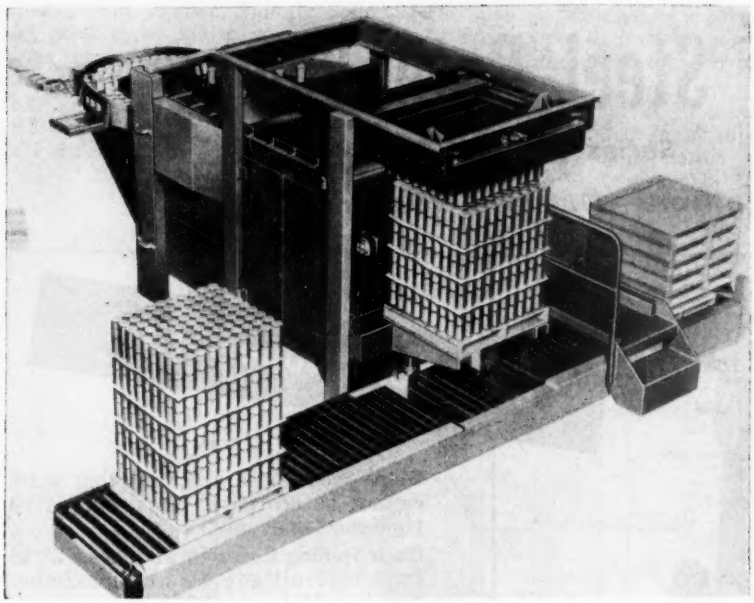
- **VERSATILITY**
  bundles in Kraft, glassines or cellophane
- **REDUCED COSTS**
  greater production and shipping costs reduced
- **IMPROVED APPEARANCE**
  custom wrapped; permits mass displays
- **COMPACTNESS**
  machine occupies less factory space

Your inquiries concerning detail performance characteristics are invited.

SCANDIA

Manufacturers of Better Packaging Machinery

SCANDIA MANUFACTURING CO. • 500 BELLEVILLE TURNPIKE • NORTH ARLINGTON, N. J. • PHONE KEARNY 2-8400
330 South Wells St., Chicago 6, Ill.



Automatic Unit Speeds, Eases Can Handling

Palletized bright cans are claimed gently and speedily unloaded by compact, automatic machine.

Named Stackmatic, pallet unloader employs principle of electro-magnetic pickup. Machine efficiently unstacks loaded pallets and single-files cans in proper position for labeler at rate of 1,200 cases or more per hr, depending on can size.

Unloader is designed for capacity and flexibility in handling various can sizes, either in straight or nested patterns. Maker states, performance tests in plants where unit is installed show processors save from 2 to 4 cents per case in their labeling operations, depending upon degree of mechanization employed in their present operation.

Maker's engineers reveal that even without mechanical pallet handling systems, unloader has a capacity of 800 to 900 cases per hr. This capacity can be increased to 1,200 (No. 2 cans) cases per hr, by employing powered feed rolls and an automatic pallet stacking device.

Unloader is termed easy to install and can be used in single or multiple labeling lines.—*Food Machinery and Chemical Corp., San Jose 6, Calif.*

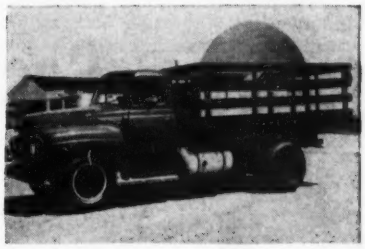
Circle 105A on Reader Service Card

New Tool Simplifies Removal of Cells

Users of storage batteries will find this new tool helpful in removing cells from batteries for examination or repair.

Tool, generally used in sets of two, consists of a U-shaped steel loop brazed to a hexagonal steel nut with specially-cut threads tapering from bottom to top. Nuts are screwed down over lead posts, a piece of wood is placed in loops and cell is pulled from battery by a chain or rope. Same tool is also used with hold-down clips for removing elements from jar.—*Gould National Batteries, Inc., Trenton, N. J.*

Circle 105B on Reader Service Card

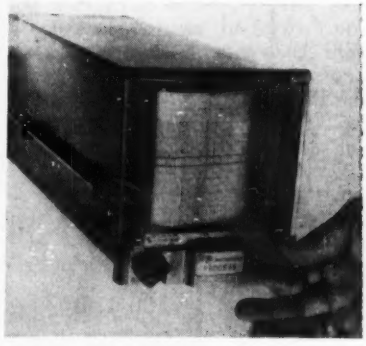


Medium-Duty Trucks Employ LPG Fuel

This truck, model RP-160, equipped with liquefied petroleum gas fuel system is one of five medium-duty LPG models recently placed in production.

Series ranges in gross vehicle weight from 14,000 to 17,000 lb. Models are the RP-160, RP-161, RP-162, RP-164 Loadstar for heavy hauling, and R-165 Roadliner for over-the-road tractor service. Engine is the 108-hp. valve-in-head Silver Diamond 240.—*International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill.*

Circle 105C on Reader Service Card



Miniature Unit Records Four Variables

Four variables can be received on this new miniature recorder.

Capable of housing a maximum of four simple pneumatic receivers, the instrument can record two variables and indicate two more, or record three and indicate the fourth, as well as performing many simpler functions. Called the Ratographic, it is suitable for standard, graphic or semi-graphic panel mounting.

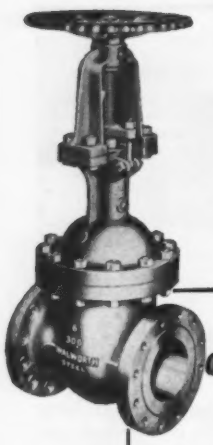
To transform the unit into a recording-controller offering the advantages of a loading station, a standard field-mounted pneumatic controller may be plugged into the back of the recorder chassis. This assembly might, for example, record signals

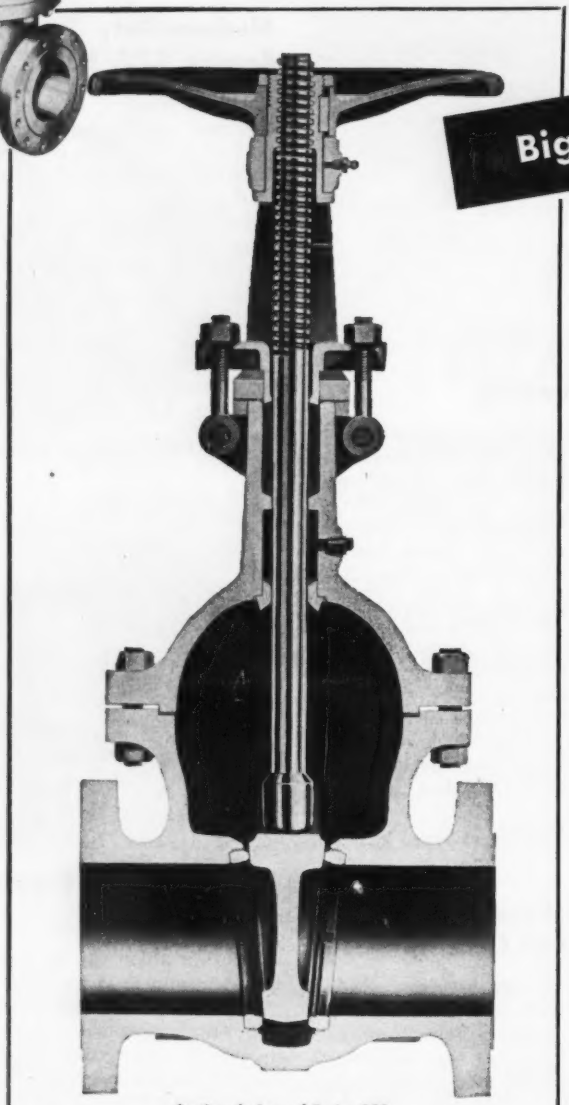
WALWORTH

Cast Steel Gate Valves

Series 150 and 300

Wedge Gate — Outside Screw and Yoke





Sectional view of Series 300

Big 8-Point Superiority!

Gland clearances are such that stem cannot be scored if gland should be tightened unevenly.

Deep Stuffing Boxes in all sizes (2″ to 24″) insure tightness and maximum packing life – costly leaks are eliminated.

Bonnets and Bodies are engineered to withstand pressure and minimize distortion – they're tough, durable, dependable.

Heavy Steel Walls provide extra strength and longer life.

Integral Body Guide Rib Faces are machined to insure accurate disc seating.

Seat Rings are bottom seated – not flange type. No recess exists at back of ring – hence no turbulence, erosion, or pressure drop.

Streamlined Ports allow high velocity, non-turbulent flow, and reduce the possibility of erosion.

Valves regularly have flanged ends. They can be supplied with ends for butt welding. Roller bearing yokes are available. On valves 5 inches and larger, by-passes can be furnished.

For Series 600 and higher, we recommend Walworth Pressure-Seal Steel Gate Valves.

For further information on Walworth Cast Steel Gate Valves, see your local Walworth distributor, or write:

WALWORTH

valves and fittings

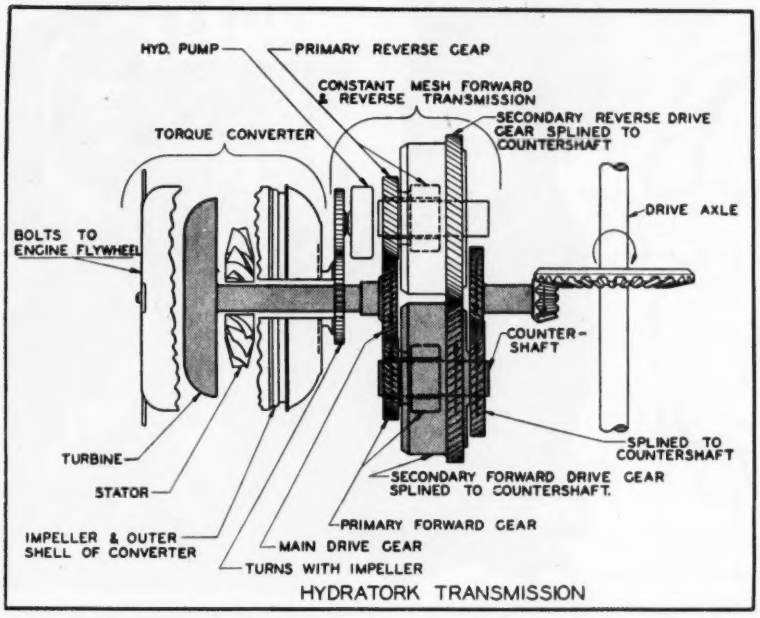
60 EAST 42nd STREET, NEW YORK 17, N. Y.

from both a wild line and a controlled line and, in addition, indicate both set point signal and valve signal. A large external automatic-manual transfer knob and set point knob allow easy adjustment and provide bumpless transfer.

Furthermore, set point indication, instead of being mechanically adjusted by the knob, is the result of a pneumatic signal tapped from the set point pressure regulator pneumatic line to the controller.

Instrument takes 6x6 in. of panel space; uses a 4-in. rectilinear strip chart available with either electric or pneumatic drive. Unit will continue to function even while pulled forward for examination of internal mechanism. To completely remove instrument, a catch beneath chassis must be released. Pneumatic connections are self-sealing.—*Fischer & Porter Co., 13 Jacksonville Rd., Hatboro, Pa.*

Circle 105D on Reader Service Card



HYDRATORK TRANSMISSION

Transmission Simplifies Fork Truck Driving

Equipped with this new transmission, a gas-powered, fork-lift truck is as easy to drive as the family automobile.

Known as Hydratork Drive, the automatic transmission makes it possible to operate a lift truck with same three simple controls used on an automobile; namely an accelerator, a brake pedal, and forward-reverse selector lever located on steering column. Design of unit eliminates need for gear shift for high and low gears and a clutch and clutch pedal.

One of outstanding advantages claimed for drive is elimination of clashing during gear engagement thereby effecting savings through reduced maintenance requirements. Added advantages cited are: smoother acceleration; more positive driver control at all times; quick changeover from forward to reverse motion and vice-versa, and controlled "inching" ability.

Here's how the unit works:

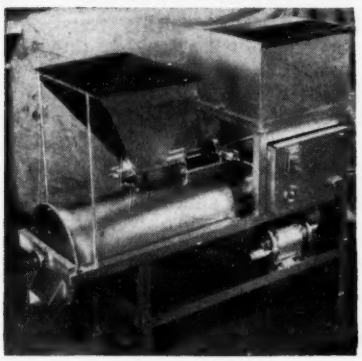
Diagram (left) shows transmission in operating position for forward motion.

Shaded area indicates those gears under power. Turbine turns main drive gear in same direction whether in forward or reverse. Main drive gear is in constant mesh with primary forward and reverse gears. Primary gears normally turn or spin free on countershaft when direction selector lever is in neutral and secondary drive gears do not move.

As indicated on drawing, secondary forward and reverse gears and direction gear are splined with countershaft. When moving forward, a piston within the secondary drive gear hydraulically engages the forward primary and secondary gears which then turn together as a unit. Since the one direction gear is also splined with the countershaft, power is transferred to the differential and truck moves forward.

When operating in reverse, turbine and main drive gear still turn in same direction. Since power is now transferred through reverse primary and secondary gears, the forward primary gear is turning free. This allows the forward secondary gear and the direction gear to reverse.—*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Circle 107A on Reader Service Card



Slicer-Mixer Maintains Sugar-Fruit Ratio

Exact mixing of correct proportions of sugar and fruit is automatically maintained by this slicer and mixer unit. Machine can be used for any kind of fruit from strawberries to apples, while movable slicer permits processing of either whole or sliced fruits.

Variable machine speed can be adjusted to allow output up to 10,000 lb. per hour of completed product. Sugar mixing ratios can be changed from proportions within 2½ to 1, to 5 to 1, without stopping machine or changing speed of sprockets. An electric eye control shuts down entire unit if level of fruit fed into hopper drops below desired measure.

In operation, fruit is fed into receiving chamber, through slicer if desired, and is carried by spiral end of mixing shaft into mixing chamber. Sugar pours into hopper above, and flow into mixer is regulated by measuring meter. Fins on mixing shaft completely mix sugar and fruit without

When the FLAVOR is there -the Customers are too!

Magnify Natural Food Flavor as More and More Leading Food Processors Do . . . with Zest

Your brand will be their favorite if you use *Zest* to produce more satisfying, tastier products. This miracle seasoning—pure Monosodium Glutamate—intensifies natural flavor *already in* canned foods, without adding flavor, aroma or color of its own. Low cost *Zest* is effective in tiny amounts, added either before, during or after processing. Use it in canned soups, fish, stews, vegetables, meats, poultry . . . and scores of other foods. Boosting food flavor with *Zest* is a proven method of increasing volume sales in both canned and frozen foods. Write today for all the details about profit-making *Zest!*

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-for food that tastes better sells better!

Staley's 99+% Pure Monosodium Glutamate

A. E. Staley Mfg. Co., Decatur, Illinois

OTHER QUALITY STALEY PRODUCTS FOR FOOD PROCESSORS

SWEETOSE®—enzyme-converted sweetener for firmer texture, better flavor

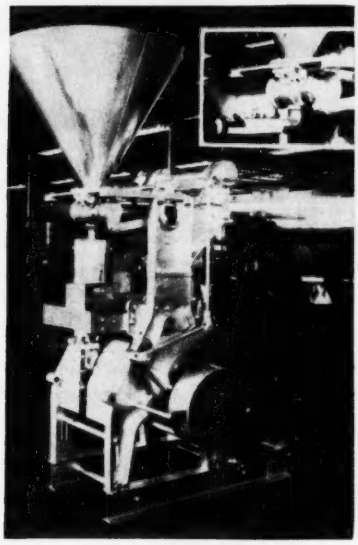
Sta-Sol®—lecithin concentrate gives more complete mixing, prolongs shelf life

Staley's C. S. U.—High quality standard corn syrup

bruising or mashing delicate product.

Unit is 73 in. long, 57 in. high and 46 in. wide, with welded steel frame. All contact parts are of stainless steel (18.8). Three-phase, 60-cycle motor operates on 220 v. ac, with controls enclosed in waterproof cabinet. All parts are easily accessible for servicing and cleaning.—*H. A. Reinhardt Co., 77 Church St., Newtown, Ohio.*

Circle 107B on Reader Service Card



Semi-Automatic Filler Handles Viscous Items

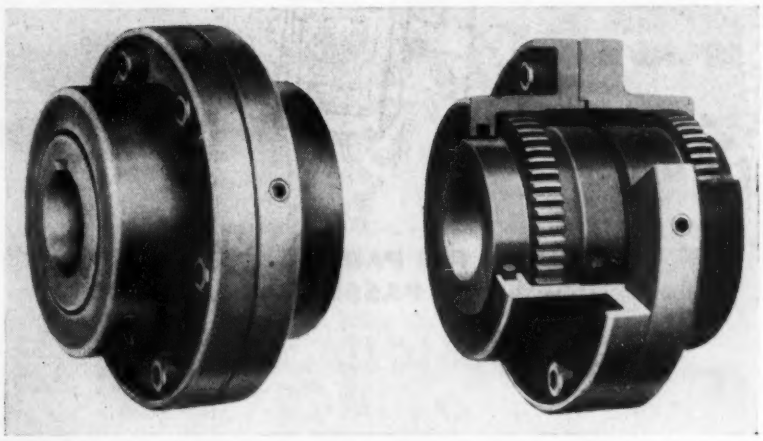
Products, with a viscosity equal that of putty, can be readily handled by this heavy duty, semi-automatic filling machine recently developed.

Versatile unit was designed particularly to fill all size tubes, cans and glass containers with such products as mayonnaise and other viscous products. Machine will fill gallon cans with only one stroke of plunger. An automatic rising table that can be adjusted for different size containers is an added feature that permits filling from bottom up, thereby eliminating air pockets.

Machine is constructed of bronze and steel, though contact parts can be made of stainless steel to provide longer life, corrosive resistance, and better sanitation.

Changeover to different size containers and products is done in only a few minutes, and unit can be equipped with casters for easy rolling to production lines.—*The Filler Machine Co., Inc., Philmont Club Station, Pa.*

Circle 109A on Reader Service Card



Flexible Couplings For High Speed, Torque

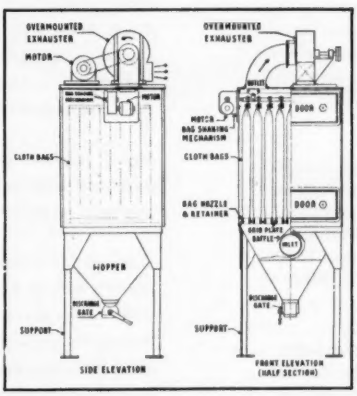
Combination of sturdiness and lightweight mark a new line of geared flexible couplings for high speed and high torque applications. Besides transmitting power efficiently, they accommodate a reasonable amount of shaft misalignment and end float.

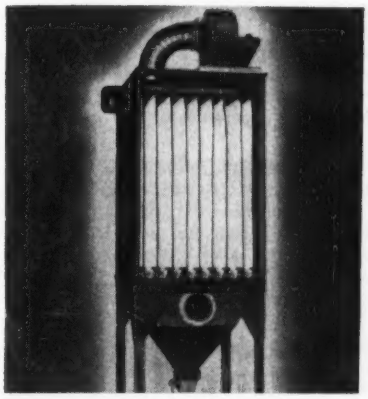
Ten standard sizes are available, with bores ranging from 1 to 6 in. and with hp. rating at 100 rpm. ranging from 2 to 450. Hubs bored for either slip or shrink fit on shaft can be furnished.

The two-section, free-floating housing has internally cut gear teeth. The two sections are rabbet fitted and are bolted together to function as a single rigid unit, forming a dust-proof, lubricant-retaining enclosure.

Wide face of internal gear teeth provides for end float of connecting shafts while maintaining full tooth contact. Externally cut gear teeth of hubs are machined to provide constant clearance at root of internal teeth of housing, thus accommodating reasonable misalignment.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle 109B on Reader Service Card





Unit-Type Dust Collector for Indoor Use

Economical and efficient dust collection for smaller volume applications, is claimed for a new unit-type CN cloth bag collector. Each unit is shipped ready for installation.

Collector is designed for indoor use and cleaned air can frequently be discharged inside plant—a distinct saving where air is heated or cooled. Finely divided dusts are collected through cloth filter bags.

Dust laden air enters collector where it is expanded in a settling chamber. Here, reduction in velocity drops coarser dust particles directly into hopper. A baffle plate prevents air from rising immediately to cloth bags, and therefore only escape for air is through open bottom of bags. Air then flows into bags where fine dust particles are filtered on inner surfaces. Cleaned air passes through

THE PARADE IS PASSING

Waldin Smugg

Unknown to Waldin Smugg (the food processor who lives inside a stone wall of complacency), instrument makers are quite likely to perfect a "smell-meter" . . . an automatic odor-sensing instrument.

Now, because there are so many kinds of food products, chances are this instrument will first be used to control quality in a different *kind* of food plant than Smugg's. It may be ideal for his product. But he won't hear about it. You see, he only reads about what's going on in his own *kind* of food plant.

Smugg pooh-poohs the idea that he can learn anything from *other* kinds of food plants. Walled in by this narrow view of things, he doesn't see the tidal wave of *engineering* sweeping through *all* food plants. He doesn't see the same engineering ideas – indeed, the same equipment and materials – being used by many kinds of plants . . . to cut costs, to build quality.

So, many of Smugg's competitors – who read about *all* plants in FOOD ENGINEERING – will learn of the "smell-meter" when it comes, and they'll be one more jump ahead of Smugg. For FOOD ENGINEERING's editors do a unique job: they report the detailed engineering progress in *every kind* of food plant. They help each kind of food plant use the experience of the others.

Even beyond that, they have the help of the largest fact-finding, fact-reporting organization serving *all* industries . . . the organization that *coined* the word "electronics," that constantly seeks out the *new* in materials-handling, machine design, labor relations, maintenance, and hundreds of other live subjects . . . McGraw-Hill, *"Headquarters for Business Information."*

Waldin Smugg is shutting out this world of useful information. If you see him, tell him. If you see him in your mirror . . . look over *your* wall with FOOD ENGINEERING.

LOOK OVER **YOUR** WALL

WITH FOOD ENGINEERING

CONTROL INSTRUMENTS

THE TIDAL WAVE AND YOU:

CONTROLS ARE BORROWED, EXCHANGED

MOST food plants would be out of business right now if they hadn't "borrowed" instruments first applied to food processes supposedly "unlike" their own!

The chart above shows how one food-plant variable after another has come under automatic control. In each case, one kind of food plant started it, others followed.

For example, *bakeries* probably pioneered organized automatic control with a simple "on-off" oven-temperature instrument. Soon this simple instrument spread to *cannery* retorts – and cooking kettles elsewhere. Now, far more complex automatic temperature control is commonplace throughout the food industry.

***Sugar refiners* pioneered automatic pH control. Now pH is automatically controlled in advanced *dairy* operations and continuous *jelly-making*. And it's only *started*.**

***Automation – automatic control – is the key to every food plant's future existence.* Just consider how rapidly "impossible" jobs have been conquered by food-plant instruments: in-stream gaging of color, fluidity, consistency, crystal state. Now instrumentation is hot on the trail of such elusive factors as taste and odor!**

As in the past, the readers of FOOD ENGINEERING will be first to learn of new instrumentation – *wherever* it originates. For FE reports on *all* food processes – helping each *kind* of food plant use the experience of the others . . . to cut ever-rising costs, to improve quality.

Subscription rates on page 3

bags and is discharged from collector. Flow through collector can be shut off whenever necessary and bags mechanically shaken to remove dust from inner surfaces. Dust falls directly into hopper for removal and disposal.

Bags are made of heavy weight, sateen weave, cotton filter fabric stitched vertically to form multiple tubes. They are inserted into hinged nozzles and sealed against grid plates by rubber gaskets sewed into bottom hems. At top, bags are hooked to a shaker channel which is connected to an eccentric arm operated by gear and pinion from a fractional hp. motor located outside casing.

Collector casings are constructed of heavy gage steel, with gasketed flanges bolted to structural frames. One side of casing is fitted with removable doors, top and bottom, for bag removal. Hopper is fitted with a manual discharge gate and canvas tube. Leg supports for 18 in. hopper clearance are supplied.

Seven sizes of collector are available, ranging from 200 to 1,000 sq. ft. of cloth area. Sizes 200 to 500, inclusive, have one hopper and nine bags. Width and depth are constant, additional capacity being supplied by lengthening the bag. Sizes 600, 800 and 1,000 are double sections of the 300, 400 and 500 sizes, featuring two hoppers and 18 bags, but only one air inlet and one settling chamber.—*Pangborn Corp., Hagerstown, Md.*

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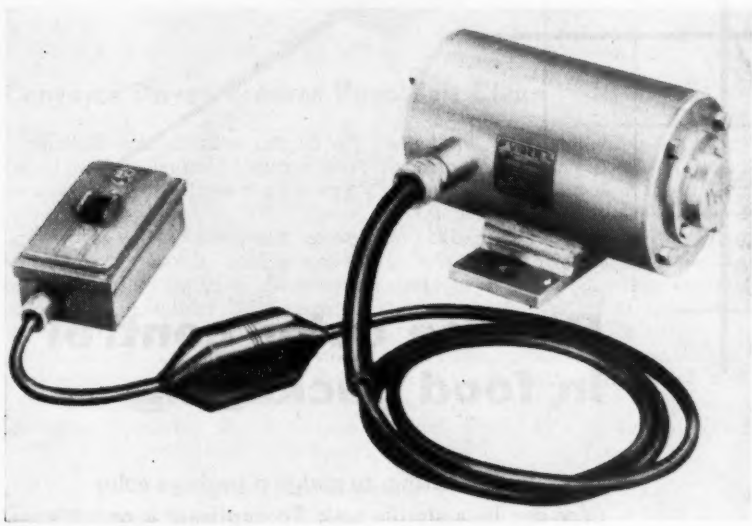

Vibrator Action Moves Bulk Materials

Movement of bulk materials—fine powders to large solids—through chutes, bins, hoppers is aided with use of this new external vibrator.

Called the Vibrelec, it is driven by a three-phase, two-pole induction motor. Unit is totally enclosed, dust-proof and water-resistant, can be operated in dust-laden or corrosive surroundings. Direct contact with product is unnecessary.

Rotary vibration also produces a directional effect on bulk materials, so that they can be moved in one direction along a horizontal surface. Unit can be operated in either direction of rotation by switching two lead wires.

Vibration is produced by an eccentric weight mounted on each end of the extended rotor shaft of the motor. Rotor and weights turn at approximately 3,600 rpm. Permanently sealed ball bearings transmit force developed through the cylindrical steel housing to mounting clamp and into material to be vibrated. Weights are equal and are locked in identical positions on opposite ends of rotor shaft, causing smooth, uniform vibration with near-silent operation.

Two types of mounting brackets are available with the unit. A round bracket with locking cam permits 360 deg. turns in positioning the vibrator. Quick-locking clamp allows unit to be moved from one location to another after installation of an extra mounting bracket at each position. For permanent installations a plain flat base is offered.—*Viber Co., 726 S. Flower St., Burbank, Calif.*

Circle 111A on Reader Service Card

Slide-Rule Calculator For Refrigeration Men

All who deal with the planning or operation of refrigeration equipment will find this slide-rule calculator a real time saver. It's free for the asking.

Calculator has temperature-pressure conversions on one side, and suction valves sizing chart on other. Table covers Freon-12 and F-22, methyl chloride, ammonia, and sulphur dioxide, with temperatures given in both F. and C. Suction valve sizing chart covers ammonia, Freon-12 and F-22, with temperatures given in F.

Vest pocket size calculator is made of heavy duty plastic and finished in three colors for clear, accurate readings.—*Hubbell Corp., Mundelein, Ill.*

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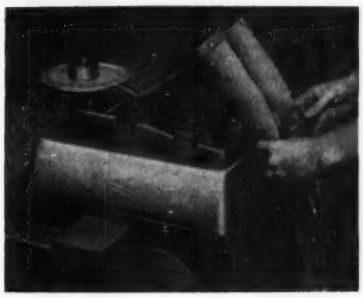
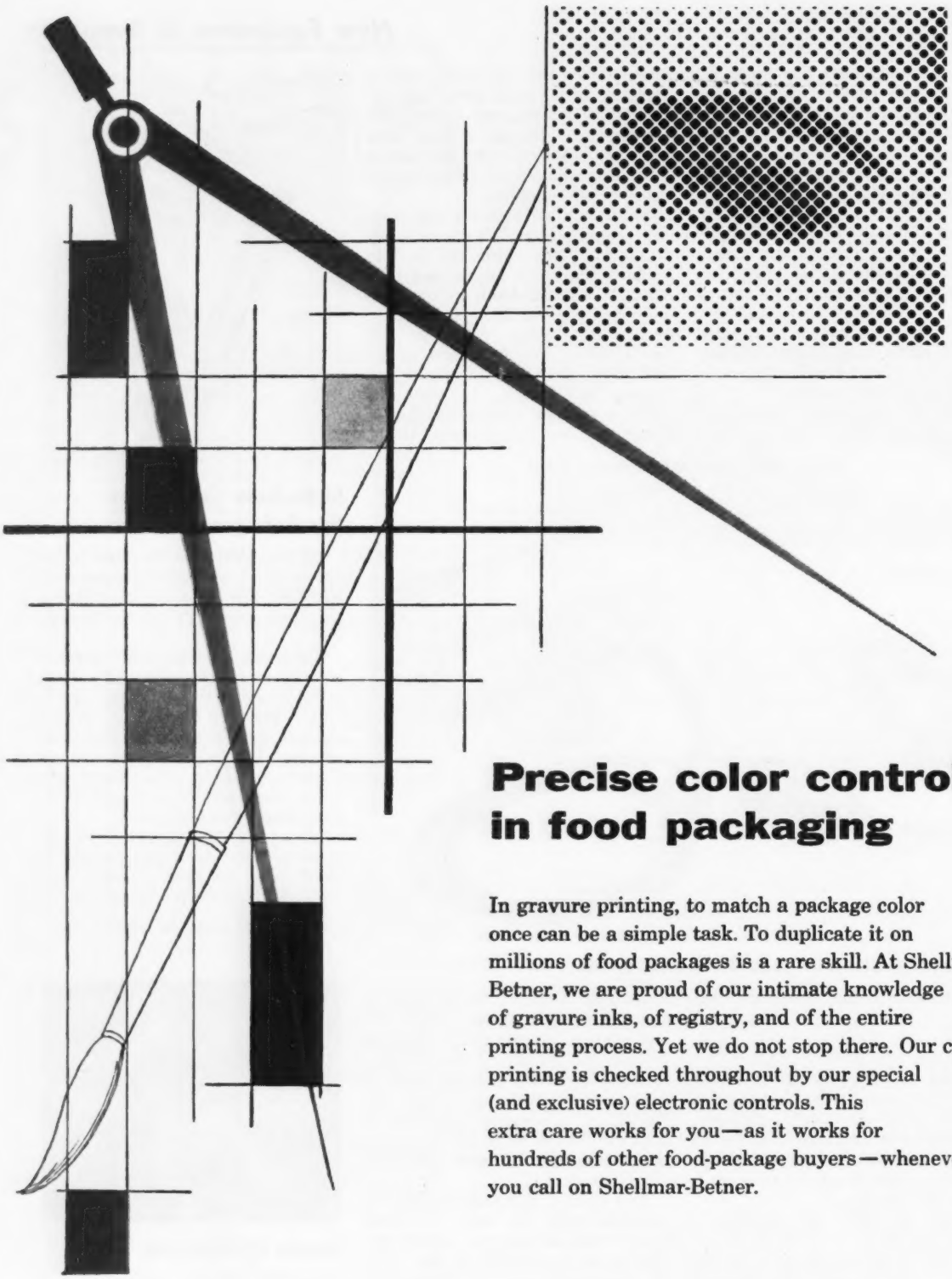


Speeds Prepackaging

WEIGHING of fruits and vegetables in prepackaging operations is speeded with use of this new Pak-Weigher. Frame, beam and tray are lightweight, non-rusting aluminum castings. Pivot knives are hardened tool steel.—*Tri-Pak Machinery Service Inc., Harlingen, Tex.*

Circle 111C on Reader Service Card



Precise color control in food packaging

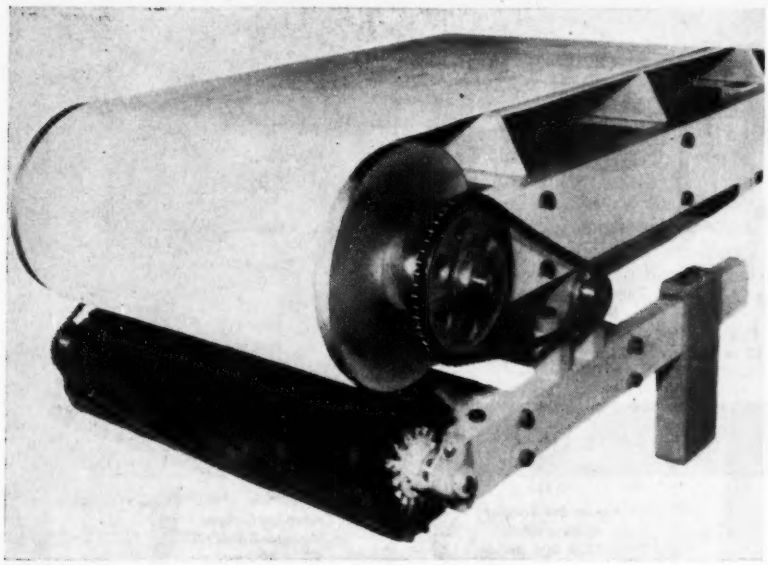
In gravure printing, to match a package color once can be a simple task. To duplicate it on millions of food packages is a rare skill. At Shellmar-Betner, we are proud of our intimate knowledge of gravure inks, of registry, and of the entire printing process. Yet we do not stop there. Our color printing is checked throughout by our special (and exclusive) electronic controls. This extra care works for you—as it works for hundreds of other food-package buyers—whenever you call on Shellmar-Betner.

CONTINENTAL CAN COMPANY

SHELLMAR-BETNER

FLEXIBLE PACKAGING DIVISION

MT. VERNON, OHIO



Conveyor Driven Brushes Keep Belt Clean

Efficient belt cleaning can be obtained with cylinder brushes driven by a power take-off from the conveyor proper.

Drive assembly, illustrated above, eliminates need of a separate power unit for brushes by tapping conveyor head pulley. A counter shaft, mounted across conveyor supports is chain-driven at one end by head pulley while other end is connected by chain drive to brush.

Frame supporting brush is suspended from counter-shaft with brush at front and adjustable counterweights in rear. Brush pressure against belt is controlled by moving counterweights. Brush speed is varied by changing diameter of any four pulleys. Field tests indicate efficient conveyor cleaning depends upon a minimum 4-1 ratio of peripheral brush speed to that of belt.

Brushes are made in standard conveyor widths with a variety of core and shaft sizes and fill materials.—*Fuller Brush Co., Industrial Div., Hartford 2, Conn.*

Circle 113A on Reader Service Card

Bulk Flour Mover Offers Many Benefits

Fast, safe, sanitary and economical distribution of flour in bulk is provided by this new type trailer. Further, its use also reduces inventory space requirements in bakeries.

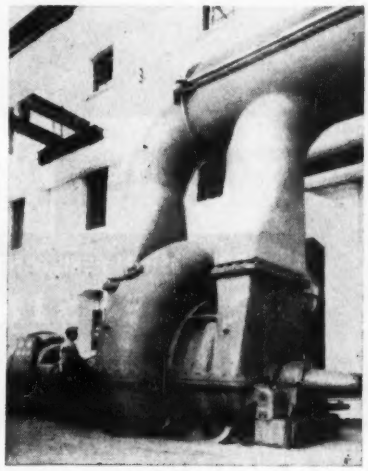
Flour is transferred through tubes from mill to trailer, carried to bakery in sealed, lined compartments, and discharged at rate of 800 lb. per min. into bakery's storage bins. Flour is never exposed to air during transfer.

Cost of labor and materials involved in storing, filling, loading, emptying and salvaging of bags is eliminated. There is no loss of flour from spillage and breakage that accompanies handling of bags. Flour dust is no longer a factor and sanitation is definitely improved. This method of handling minimizes possibility of contamination.

Tank trailer carries a 28,575 lb. payload of flour. Overall trailer length is 35 ft. and total weight, including twin screw discharging equipment and tractor and coupler, is about 57,000 lb. Glass fiber insulation, 2 in. thick, line the top of shell and two-thirds of sides. Unloading equipment consists of two individually controlled worms or screws operated in conjunction with a patented actuator system installed by the Atkinson Milling Co., Minneapolis.

Present plans call for manufacture of this tank trailer either with or without discharging equipment. While pilot model is designed particularly for milling and baking industries, trailer should have a wide application wherever bulk materials of a similar nature are carried.—*Fruehauf Trailer Co., 10940 Harper Ave., Detroit 32, Mich.*

Circle 113B on Reader Service Card



Vapor Compressor-Condenser

CAPACITY of this evaporator vapor-condenser is 250,000 lb. per hr. Unit is a product of Escher Wyss Co., Zurich, Switzerland. Through an arrangement with this firm, covering sales and manufacturing rights for the North American Continent, these machines are now available from—*Cleaver-Brooks Co., Milwaukee, Wis.*

Circle 113C on Reader Service Card

HEADQUARTERS FOR PRODUCTIVE PROCESSING EQUIPMENT SINCE 1928

COOKING KETTLES

Style A
Two-thirds Jacketed
5 to 500 gal.

Style B
Full Jacketed
10 to 300 gal.

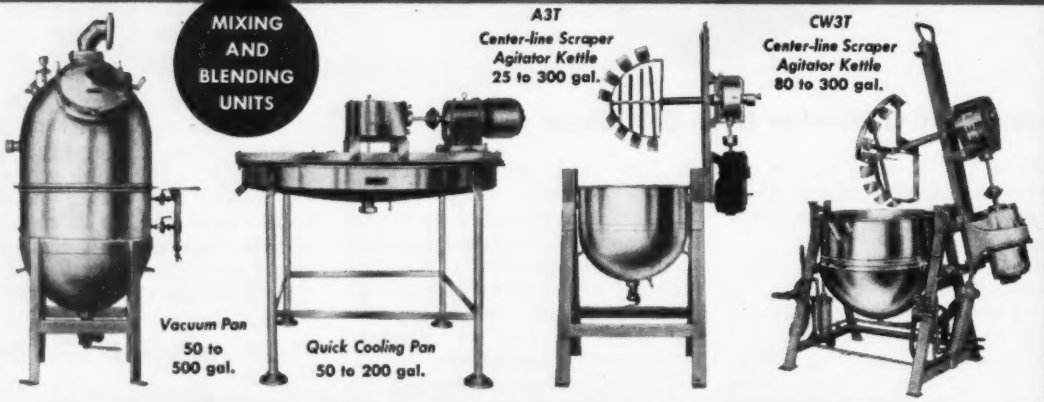
Style C
Two-thirds Jacketed
5 to 100 gal.

Pressure Kettle
Two-thirds Jacketed
40 to 200 gal.

Style CW
Two-thirds Jacketed
80 to 300 gal.

WIDE RANGE OF SIZES TO MEET YOUR NEEDS

MIXING AND BLENDING UNITS



Vacuum Pan
50 to 500 gal.

Quick Cooling Pan
50 to 200 gal.

A3T
Center-line Scraper Agitator Kettle
25 to 300 gal.

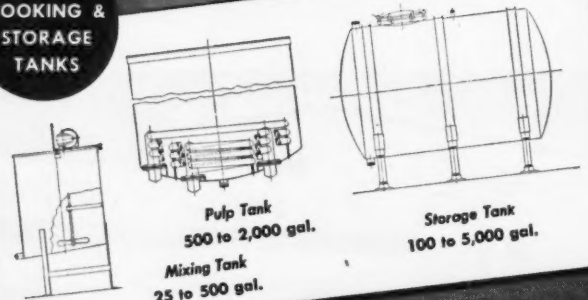
CW3T
Center-line Scraper Agitator Kettle
80 to 300 gal.

ALL LEE'S BUILT FROM TIME-PROVED STAINLESS STEEL

LEE

CORROSION-RESISTANT
PROCESSING EQUIPMENT

MIXING, COOKING & STORAGE TANKS



Pulp Tank
500 to 2,000 gal.

Mixing Tank
25 to 500 gal.

Storage Tank
100 to 5,000 gal.

Precision-built to your specific requirements!

LEE corrosion-resistant equipment is individually-designed for a specific processing operation and precision-built to give long years of peak performance with a minimum of maintenance.

Descriptive technical bulletins are available. Write for them and find out how Lee can be of real help in solving *your* processing problems.

LEE METAL PRODUCTS CO., INC.
416 Pine Street
Philipsburg, Pa.

ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

Float-Trap Removes Corrosive Liquids

Speedy removal of corrosive liquids from air, gas and steam confined in piping systems and equipment is reported with a new, stainless steel, float trap.

Automatic trap continuously drains liquids as fast as they are formed without permitting escape of air or gas. Trap mechanism consists of a valve and seat, a lever, and a ball float inside of a case—all made of stainless steel. Liquid, upon entering unit at top raises float, opening valve, and escapes. An accumulation of any steam or gas lowers liquid float, causing float to drop. This action closes valve.

After assembly each trap is given a final hydrostatic test to check tightness of valves, gasket joints and body. Made in sizes ½ to 2 in. they are designed for 300 lb. pressure and maximum total temperature of 800 deg. F.—*V. D. Anderson Co., 1935 W. 96th St., Cleveland 2.*

Circle 115A on Reader Service Card

New Support Protects Glass-Lined Tanks

A new brewery tank support which will hold a glassed-steel tank and contents secure even through shocks of earthquake force has been perfected.

The floor cradle-type support is designed for giant horizontal tanks holding more than 30,000 gal. and weighing in excess of 150 tons when full.

Support provides for tank "breathing" by holding it with a girth band that employs a floating cradle of steel. Tank expands when filled, yet it is held securely.

Simulated earthquakes, applying horizontal force up to 40,000 lb. tested the supports shock-resistant powers at manufacturer's plant. This is almost half the load deadweight in a horizontal direction.

Girth band is welded to support which, in turn, is anchored to steel supports embedded in concrete. Band is adjustable so that it can be clamped to tank at almost any point, instead of only at ends.

Ability of band to adjust itself to changing contour of tank is unique, according to maker's engineers. It has made possible locating supports on shell of tank without injury to glassed interior.

Until now, all band type supports have been located at heads and suspended from ceiling beams. New design eliminates heavy building superstructures and is adaptable to modern one-story type building. — *Pfaudler Co., Rochester, N. Y.*

Circle 115B on Reader Service Card

Industrial Vacuum Unit Speeds Cleaning Tasks

Thorough, fast cleaning is reported with use of this new industrial vacuum cleaner.

Unit is said to pick up dirt, chips, liquids, cutting oils faster due to air handling system that features a new fan and chamber designed to give high power and suction. Water can be picked up by machine at rate of 40 gpm.

Tank is equipped with dump valve for easy emptying. Large capacity makes unit suitable for sump and boiler cleaning. For dry pick-up, large tank and big filter bag, allows machine to operate over long periods without necessity of emptying.

Dolly is equipped with neoprene rubber casters for easy rolling under heavy loads. Spring holds handle close to tank when not in use.

Motor unit is removable for use as a blower or portable vacuum cleaner. — *American Cleaning Equipment Corp., 2029 S. Halstead St., Chicago 8.*

Circle 115C on Reader Service Card

Portable Radio Phones Provide Area Contact

Of interest to processors whose operations extend over a considerable area is this new Portafone, a quick, flexible means of short range communication.

A self-contained transmitting and receiving radio, the unit is light weight and can be comfortably held and operated in one hand. Unit has a transmitting range from several hundred yards to many miles depending on location and terrain.

Transceiver carries Federal Communications Commission Class B radio telephone type approval, and operates in the citizens radio band at fixed frequency of 465 megacycles. Citizens band is that segment of ultra

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—page 159. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

PAGE

MISNUMBERED

let's talk Citric!

orders...small, medium, large

dispatched promptly!

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● It may be your requirements for citric run into carload quantities. Or, if you use citric only occasionally, they may be small. Whatever your needs are, there's a type and a container size ready to be dispatched post-haste to your plant.

Pfizer Citric Acid U.S.P. Anhydrous... "with the water squeezed out"...comes in these mesh sizes: granular, fine granular, powder. Packed in 25, 50, 100, 225, 250 lb. drums, and 100 lb. bags (5 bag min.).

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If your demands are small, medium or large . . . order Citric from Pfizer today!

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Manufacturing Chemists for Over 100 Years **Pfizer**

high frequency spectrum which lies between the land Mobile Radio Services and the UHF televison channels. Station license for this approved equipment is easily secured.

Phone may be operated as a portable station when used with a battery pack, or as a fixed central radio station by connecting it to a special power pack designed to plug into any 115v. 60 cycle, a.c. electric outlet. It may also be operated in an automobile by plugging a special adapter into the cigaret lighter socket of the car's instrument panel.

Portafone requires an FCC station license, but not an operator's license. It is sold in pairs, combining a transmitter and receiver in one instrument similar in appearance to a telephone handset. Weight of instrument is 28 oz.—*Stewart-Warner Corp., 1826 Diversey Pkwy. Chicago 14.*

Circle 117D on Reader Service Card

New Chemicals

New Spray Provides Fast Foam Control

Speedy effective foam control in laboratory, pilot plant and small scale processing is claimed with use of a new conveniently operated hand spray.

Called Antifoam A, it is a dispersion of silicone compound in Freon. The aerosol-packaged mist is released at touch of a valve. Preliminary measuring and mixing, over-application, and delays waiting for inhibitor to become effective are all eliminated.

Silicone compound is an effective foam-killer. Useful in small concentrations, compound's only limitation is that it occasionally requires some preliminary measuring and mixing before it can be rapidly and thoroughly dispersed in the foaming medium. This limitation is effectively overcome by the spray, which instantly blankets foamer with a cloud of finely divided particles of silicone.

Effective concentrations of silicone usually range from 0.01 to 1.0 ppm., or far less than 10 ppm. which the Food and Drug Administration has permitted in foods. In most cases, no trace can be detected in finished batch after defoaming. Highly volatile Freon propellent vaporizes immediately and harmlessly upon discharge.—*Dow Corning Corp., Midland, Mich.*

Circle 117A on Reader Service Card

Dust Free Detergents Up Dairy Sanitation

Improved dairy sanitation is reported with use of new dust free detergents recently developed.

New compounds—there are five—are specifically designed for performing sanitation work usually done by manual methods in many plants. Dust emission or formation is stated to be eliminated and detergency improved.

Features cited by maker include: Increased soil penetration; stepped up cleaning power; more thorough rinsing in less time; lower solution concentration.—*Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14.*

Circle 117B on Reader Service Card

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In Behalf of Progress . . .

What It Takes to Get More for Your Labor Dollar

How to get more for your labor dollar is a difficult problem with many facets.

You're dealing with a complex bundle of biology and emotions—a bundle much like yourself. Often you get sad results because you have not included all the basic factors in the human-performance equation.

These factors fall logically into four types:

1. Morale—Or keeping workers happy, interested, willing, and cooperative members of your team.
2. Incentives leading to better performance.
3. Aids which increase worker productivity.
4. Avoidance of time-wasting production-line delays.

Make improvements in each of these and you'll hit pay dirt. So will your workers. Fail in one, and the good you do in the others may be nullified.

But under each of these broad categories of labor is a multitude of items, each of which importantly affects human attitudes and performance. Let us explore them quickly:

Morale—Rate of pay obviously affects morale, performance, and costly labor turnover. But the amount of money in Joe's pay envelope is not the only thing. His pay must be in proportion to the requirements of his job, to his merit, and to the pay of others.

Still, money is but one of many things that sooth the human spirit. Every worker takes more interest in his job when he understands his importance in the larger scheme of operations.

A good industrial "home" in which to live while at work means much, too. Is your plant a neat, comfortable, safe, and pleasant place to work? Are your supervisors fair, while firm, with their people?

Lack of information about the company for which they work—especially its policies, plans, and profits—can cause more grousing among workers than real grievances. Do you make information about the business available to employees on the line? Do you have an effective system of communications?

You can't have good labor relations without good public relations—and vice versa. The outsider's opinion of your company affects your employee morale, and the other way around.

Steady employment means enough to workers to justify major changes to provide it. It means a lot to you, also.

Then you need adequate facilities for employees, as well as activities and recreation.

Finally, no one can overlook these almost mandatory fringe benefits: Group life insurance, pension plans, medical plans, vacations, and refreshment periods.

Quite a package! And you are only started.

Incentives—You hit pay dirt directly when you provide effective incentives to higher productivity.

But here's where plans must be meticulously tailored to fit the exact situation in your plant. Incentive pay works in certain forms, under certain circumstances—but by no means always. Even more so for profit sharing.

Merit rating and advancement to better jobs and higher pay are good incentives for your better, more ambitious workers. And the employees who benefit begin to depend more on management and less on union leaders for higher pay.

Fair job standards, with some incentive to exceed them, inspire conscientious laborers.

Suggestion systems pay off in higher efficiency and perk up the pride of employees.

Machine pace-setting, where feasible, is the surest "incentive" to a good day's work for the run-of-mill laborer.

Aids to Productivity—Incentives aren't enough. You must take steps to make work easier and speedier. Eliminate unnecessary motions, provide devices and tools to assist the worker, and install effective lighting.

Check and correct worker vision and provide on-the-job medical attention to minor ailments.

Select good supervisors who can properly train workers and get a day's work out of them. Then set up a training program for the supervisors.

Above all, use some system better than a hunch to select and place workers.

So you do all these things. So you still have one foot in a bucket if you have a limping production line.

Avoiding Production Delays—Accidents are far more serious time wasters than most managers realize. When a man is injured, his lost time often is multiplied many times by distraction of others around him. And accidents during some years have cost 30 to 50 times as many man-hours as strikes.

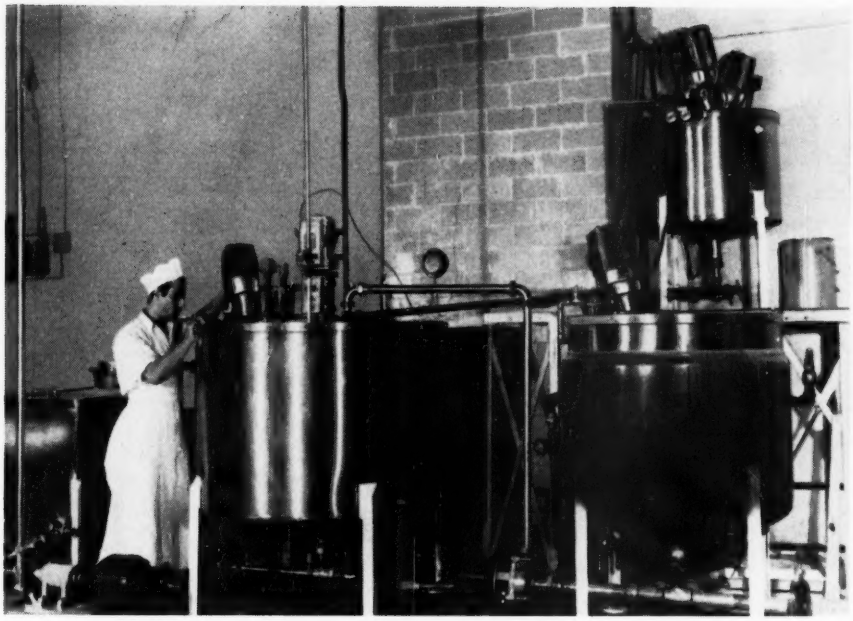
Poor maintenance is a terrific impediment to productivity. You can't afford sick equipment.

It goes without saying that proper work scheduling and adequate supplies are essential.

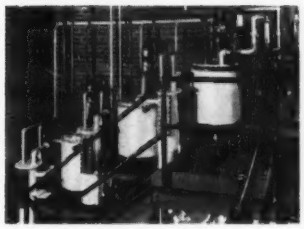
And only with minimum absenteeism can you operate your lines at rated capacity day after day.

Yes. It is a man-size assignment, this task of stretching the labor dollar. But it is something more food manufacturers must face—and squarely.

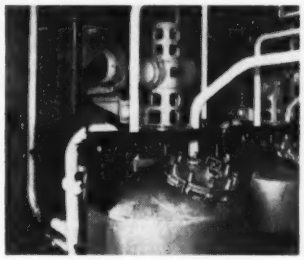
PS—Food Engineering is regularly providing information and ideas to help you with this important problem.



ANY TANK OR KETTLE becomes an efficient mixing unit when you add a LIGHTNIN Portable Mixer. No baffling is necessary. The mixer can be removed or switched to another tank at any time. More than 30 models. Sizes ⅛ to 3 HP.



FOR PRESSURE or vacuum mixing, propeller-type LIGHTNIN is easily bolted to tank nozzle. Has integral stuffing box, ready to operate. Sizes ¼ to 3 HP.



FOR LARGER BATCHES turbine and paddle type LIGHTNIN Mixers provide exact balance of flow and turbulence for maximum results. Hundreds of power-speed combinations. Sizes 1 to 500 HP.

5 ways to CUT fluid mixing COSTS

1. You can mix big batches—as big as you want—with a standard LIGHTNIN Mixer. For instance, you can blend as much as 3,000 gallons of syrup, filling, or thin sauce—as much as 500 gallons of heavy batter—with a portable propeller-type LIGHTNIN.

2. You can switch a LIGHTNIN Portable Mixer from tank to tank, as your mixing requirements change. You can get shafts and propellers to fit different batch sizes, saving much of the cost of a complete new mixer.

3. You can handle peak loads, by adding a simple tank or kettle to the line. Clamp a LIGHTNIN Portable in place, and you're ready to start mixing.

4. You can save costly man-hours by refusing to let personnel mix or stir with hand paddles. Even on simple mixing jobs, it's much faster, cheaper (and results are always uniform) when you let a LIGHTNIN do the work.

5. You can be sure about results, because every LIGHTNIN Mixer is *fully guaranteed* to do the mixing job *right.* Many LIGHTNINS have been running smoothly for 20 years and more.

"Lightnin® Mixers"

GET THESE HELPFUL FACTS ON MIXING

LIGHTNIN Catalogs contain practical data on impeller selection; sizing; best type of vessel; installation and operating hints; full description of LIGHTNIN Mixers. Yours without obligation. Check and mail coupon today.

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fluid mixing specialists

- ☐ DH-50 Laboratory Mixers
- ☐ DH-51 Explosionproof Laboratory Mixers
- ☐ B-102 Top Entering Mixers (turbine and paddle types)
- ☐ B-103 Top Entering Mixers (propeller type)
- ☐ B-104 Side Entering Mixers
- ☐ B-105 Condensed Catalog (complete line)
- ☐ B-107 Mixing Data Sheet
- ☐ B-108 Portable Mixers (electric and air driven)

MIXING EQUIPMENT Co., Inc.
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In Canada: **William & J. G. Greey, Ltd., Toronto 1, Ont.**

Please send me, without obligation, catalogs checked at left.

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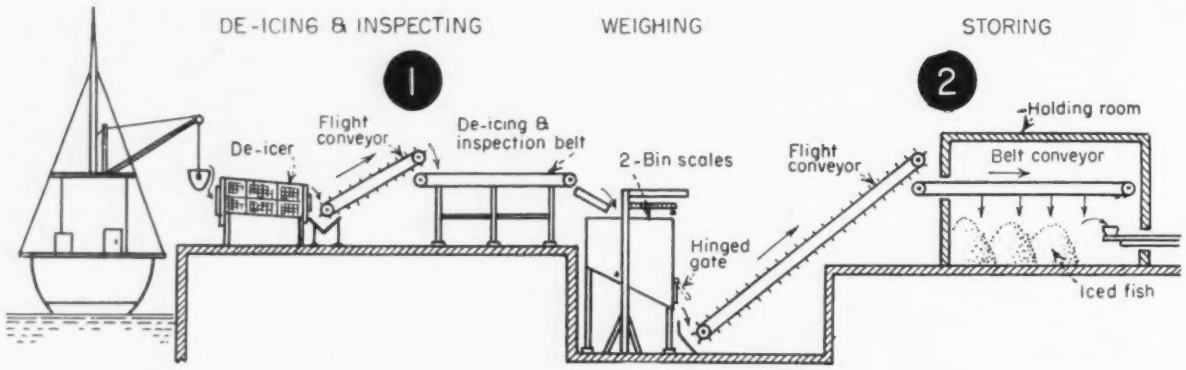


How Fish Fillets Are Machine-Processed

Specially Designed Fish Heading and Filleting Units Zoom Output

NEW, highly efficient machines and mechanized handling have now taken the processing of fresh frozen fish fillets a long step forward.

In fact, operations are now almost as completely mechanized as those in advanced fish-canning plants.

Notable exponent is Gloucester Fishing Co., Inc., a firm now employing a battery of seven deheading and eight filleting machines to produce 1,200 ocean perch fillets per minute in its new plant at East Gloucester, Mass.

Ocean perch are unloaded from fishing boats into 125-lb. capacity canvas baskets, which are hauled up upon the dock by a pulley line hooked to a donkey engine. On dockside, fish are dumped into a de-icer. This unit comprises a 2x12 ft. rotary screen (1¼-in. mesh) that removes ice from fish to obtain the true fish-weight, upon which fishermen are paid.

Inspection Is First

A short, wire-mesh flight conveyor next delivers the fish onto a 1x28-ft. combination de-icing and inspection table that is equipped with a wire-mesh belt—Point (1) in accompanying diagram. Here operations are normally carried out by six inspectors who discard any large chunks of ice, trash fish, and ocean perch not conforming to company standards.

Fish are then chuted to two 400-lb. capacity hopper-bottom metal bins, each mounted on a scale. Weighings are carried out continuously via hand-operated gates that divert flow of fish from full to empty bins.

From here, incoming fish are moved easily, quickly, and directly to the processing plant by a series of conveyors and flumes. Left-over fish are floor stored—with proper icing—for the next day's processing in a 130,000-lb. capacity, insulated holding room—Point (2). As needed, they are fed into a flume that directly sluices them into the processing plant.

Special Fish Heading Units

First plant operation is mechanical removal of heads from fish. Flumed fish are picked up by a flight conveyor, jet-sprayed with city water, and deposited on a conveyor belt feeding a battery of seven twin heading machines—Point (3). Speed of each machine is about 100 headless fish per min. Each machine requires two men to position fish on the metal cleats (spaced 1-ft. apart) mounted on the two chain-type feed conveyors. Fish are arranged with gills facing an angle-iron stop. Farther along, a 10-in.-dia. rotary knife cuts off the heads. The heads drop onto a rubber-belt conveyor and are then loaded into trucks to be hauled to a reduction plant, while the body is flumed to a 3x14-ft. rotary scaler—Point (4).

Fish are scaled at the rate of 15,000 lb. hourly, and without need of an operator. Weight of the tumbling mass in the revolving cylinder presses the fish against sharp edges with enough force to remove the scales. To complete the job, water sprays inside the unit wash away loose scales. Flesh of the fish is in no way seriously abraded during this mechanical scaling operation.

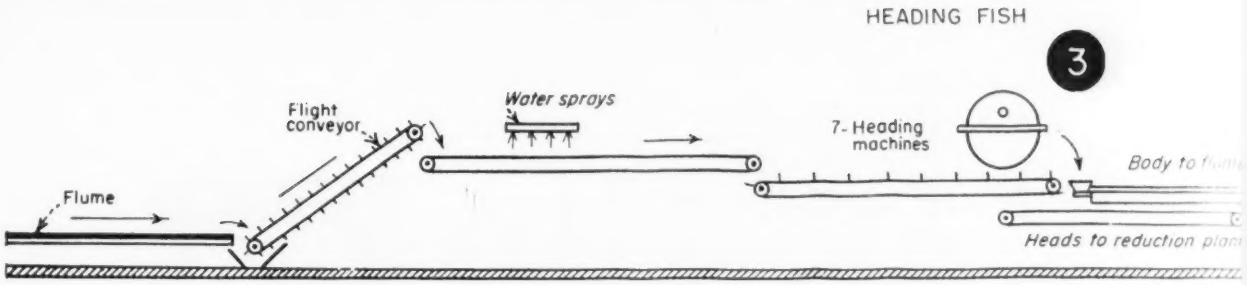
150 Fillets a Minute

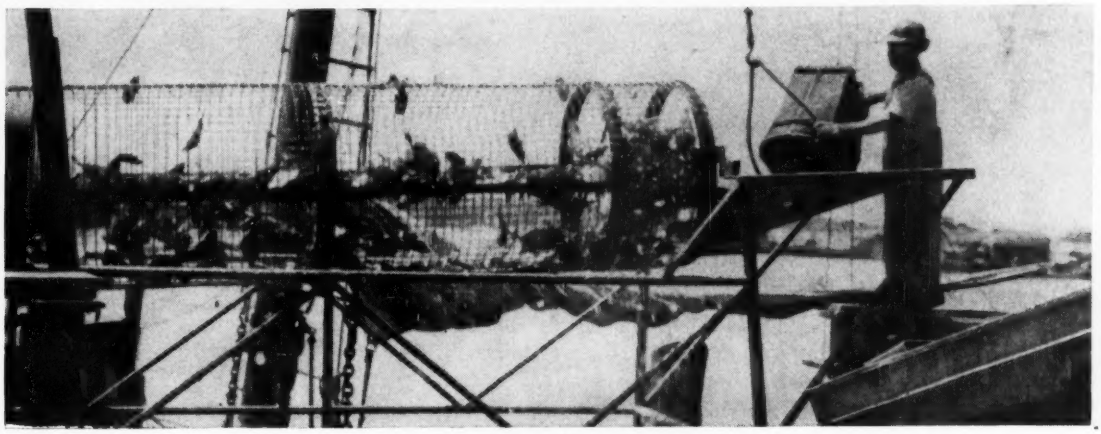
Filleting of the fish is the next operation that has been completely mechanized—Point (5). A stainless steel, wire-mesh conveyor delivers scaled fish to a battery of eight automatic filleting machines. To avoid pile-up of fish at these machines, a stationary plow diverts any overflow to a return belt.

Speed of each machine is 75 fish or 150 fillets per min. Headless, scaled perch are hand-fed, back down and tail forward, into a trough-shaped flight conveyor with six pairs of mechanical grippers. Each pair of grippers holds the tail to bring the fish into exact alignment with the center of the machine and the cutting units.

How They're Cut

Fish are now guided to the first cutting units—a pair of high-speed circular knives. These are positioned one above the other, with the lower edge of the top knife be-





SEA-TO-LAND TRANSFER

UP FROM BOATS come ocean perch in 125 lb. capacity canvas baskets. These are hauled onto dock by pulley line and fish are dumped into a rotary screen that removes ice from fish.

ing offset 0.125-0.187 in. from the top edge of the bottom one in such a manner as to make parallel cuts along the backbone.

Filleting is completed as the fish are ejected from the circular cutters to a pair of parallel ribbing knives (19 in. long) and a circular knife. The skeleton drops onto a belt, later to be trucked to a reduction plant. Fillets are sluiced in a 58-ft. flume containing 12-deg. salometer brine.

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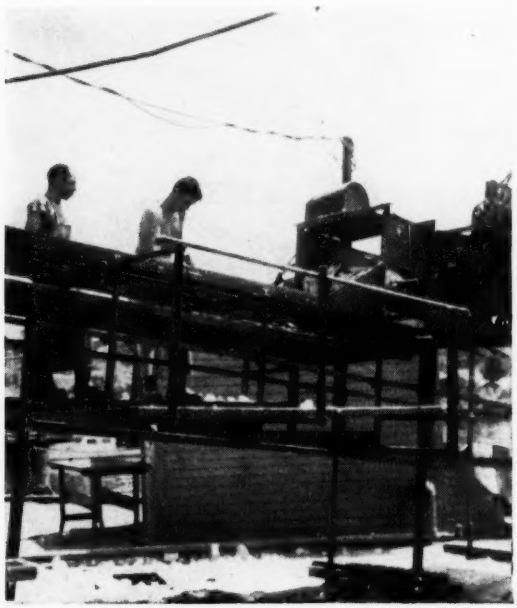

1 **DE-ICING AND INSPECTING.** Chunks of ice, trash fish, and perch not conforming to standards are discarded by workers on this wire-mesh conveyor. Personnel in this operation totals 6.

2 **COLD STORING.** Incoming fish from weigh hoppers are floor-stored with ice. As needed, fish are fed into flumes that carry them to the adjacent fish-processing plant.

3 **HEADIN**
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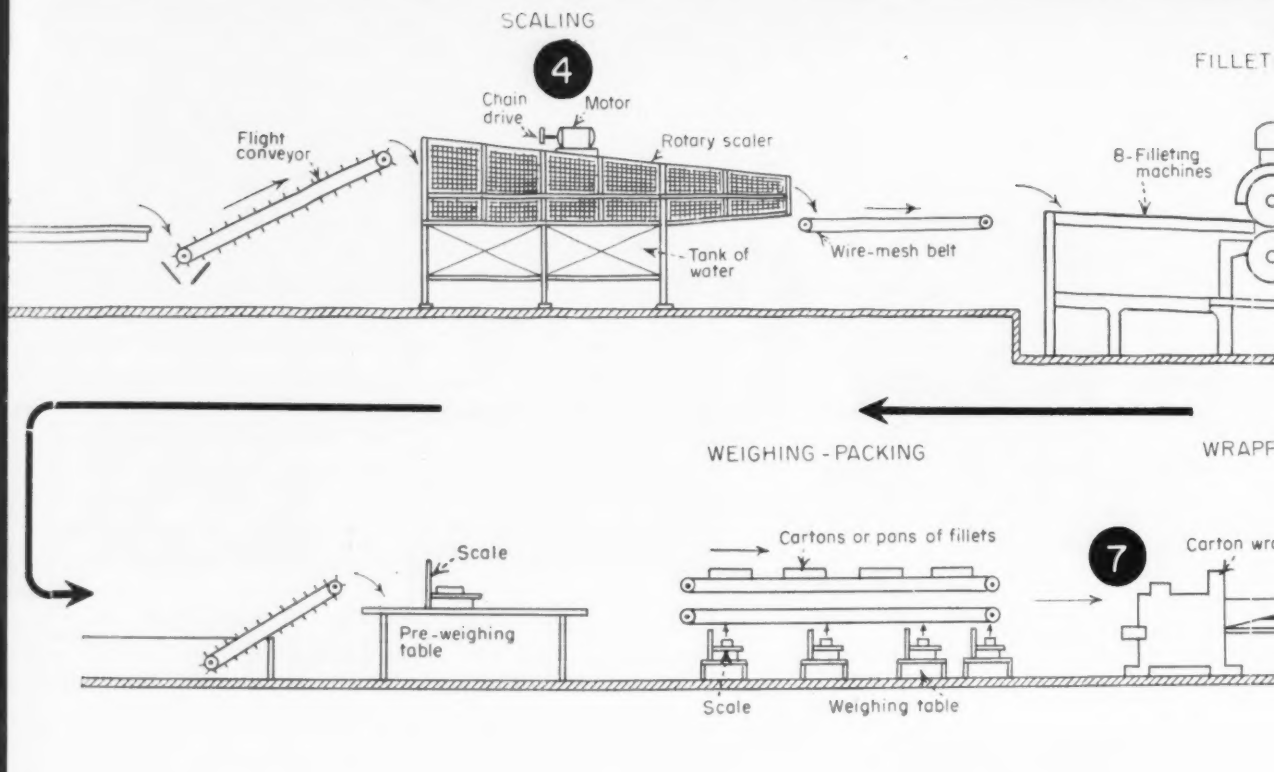
ploys a bat
fully automa



wire-mesh incline belt drains the fillets as they are ited on a 1x16-ft. rubber-belt conveyor, flanked with xiglas candling or inspection table—Point (6). Below andling table eight 100w. bulbs show up fins, tails, ruises on the fillets. Flanking the candling table are rls, who trim bruises, tails, and fins from the fillets special clippers.

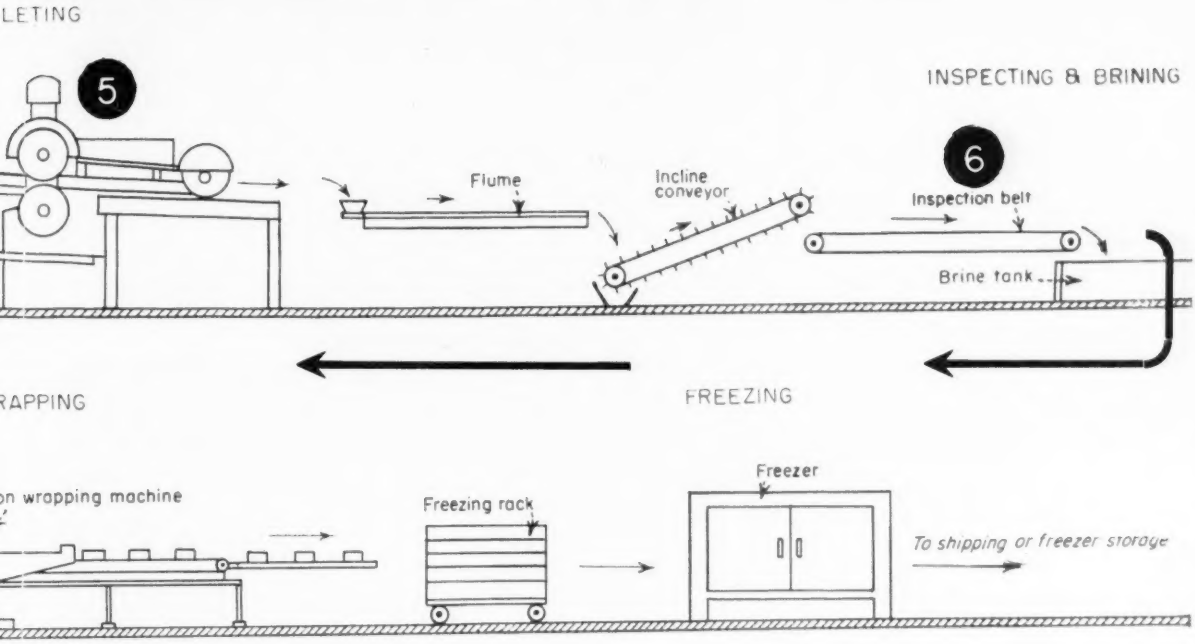
lets now drop into a 5x16x16-ft. tank for a brief immersion in 12-15 deg. sal. brine. A short flight conveyor next elevates the fillets onto two weighing tables, where they are pre-scaled into 5- or 10-lb. cartons or 15-lb. capacity stainless steel pans—Point (7). Cartons or pans are then transferred to a conveyor belt feeding a 34-ft. long packing table.

Here, 20 girls scale the cartons to a final 5- or 10-lb. weight and put on the top lids. Girls also pack fillets from the pans, weigh then transferred chinery unit tha waxed paper, or into racks, whic frozen fillets are 0-deg. F. storage to the various ou

G FISH. Dual cutting machine decapi- at rate of 100 per min. Company em- ry of seven of the specially designed ic machines.

4 SCALING. Rotary unit automatically removes scales from fish at rate of about 15,000 lb. an hour. Water sprays inside unit wash away loose scales from headless fish.

5 FILLETING. Battery of e filleting machines handle abo ute. Fillets are sluiced in a 58 brine to inspectors.



weighing them into 1-lb. cartons. These are erred to a conveyor feeding a Package Ma- t that overwraps them in printed cellophane, r, or laminated foil. Cartons are then loaded which are hauled to the freezer. Cartons of s are packed into shipping cases and held in a orage room, ready for shipment at a later date is outlets.

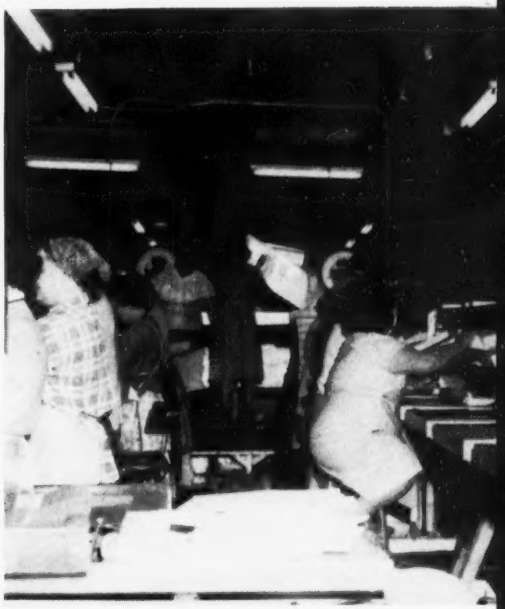
FOOD ENGINEERING

February 1954

Pages 120–123

of eight fully-automatic e about 600 fish per min- 58 ft. flume containing

6 INSPECTING. On Plexiglas candling table, with 100w. bulbs below, girls trim bruises, fins, and tails from ocean perch fillets. Brining of product follows.



7 PACKAGING. Fillets are weighed and packed into cartons holding 1-, 5-, or 10-lb. quantities. Cartons are machine-overwrapped and hauled to quick freezer, then case-packed.

GLOBE Seamless
GLOWELD Welded

- **Resistance to Corrosion**
- **Strength at High Temperatures**
- **Resistance to Oxidation at High Temperatures**
- **Ease of Fabrication**

TYPICAL ANALYSES AND TYPES:

302	309S	316Cb	330	410
302B	309Cb	317	347	430
304	310	321	403	443
308	314	329	405	446
309	316	INCONEL * — NICHROME **		

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Globe produces more than 26 standard analyses of stainless stee. tubes — also special analyses when required. Because varying analyses have widely varying service characteristics, Globe will make recommendations only after careful study of your particular problem.

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STAINLESS STEEL TUBES

Write for Bulletin 333 — Corrosion and Heat Resisting Steel Analyses Chart — a valuable reference tabulation of stainless steel analyses as produced by various manufacturers.

Piercing, rolling and reduction of seamless tubes is closely monitored from this control room — typical of the highly specialized equipment in the Globe mill.

SIZE RANGE:

Globe seamless stainless steel tubing may be had in sizes from ½ inch to 6 inches O.D., and in pipe sizes ⅛ inch to 6 inches, standard, extra strong and double extra strong weights.

Gloweld electric welded stainless steel tubing is available in sizes ranging from ¼ inch to 5 inches O.D. inclusive; in standard weight pipe (schedule 40) sizes ⅛ inch to 2 inches — lightweight pipe (schedule 5 and 10) ⅛ inch to 4½ inches inclusive.

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All stainless tubing furnished to standard A.S.T.M. specifications unless otherwise specified to suit your particular application requirements.

Globe specialization gives you uniform high quality...

Precision checks — and re-checks — at every stage of production insure Globe stainless steel tubes that meet *your* exacting specifications. For more than thirty years, specialization in production of steel tubes has key-noted all Globe research, engineering and mill operations. Write for the Globe Stainless Steel Tubes catalog.

GLOBE STEEL TUBES CO., Milwaukee 46, Wis.

Chicago — Cleveland — Detroit — New York — Philadelphia — St. Louis — Denver — Houston — San Francisco — Glendale, Cal.

Producers of Globe seamless stainless steel tubes — Gloweld welded stainless steel tubes — alloy — carbon seamless steel tubes — Globeiron (high purity ingot-iron) seamless tubes — Globe welding fittings.

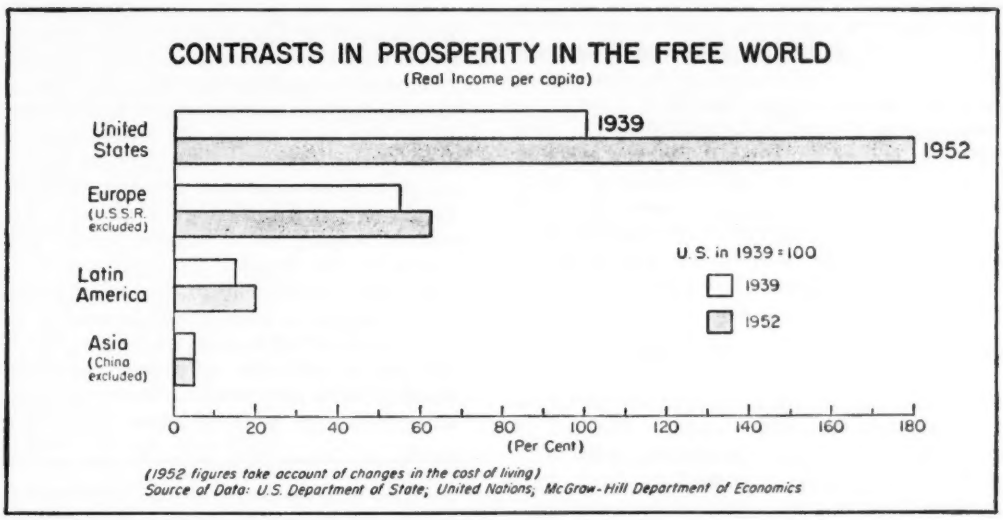
Contrasts in Prosperity Endanger the Free World

The chart in the middle of this page summarizes a situation of profound importance to every American. It shows that:

1. On the average, Americans are vastly better off economically than most other people in the free world, and
2. In recent years the gap in income between the average American and the average European, Latin American or Asian has greatly widened.

A Mounting Contrast

Even greater is the contrast between the real incomes of Asians and Americans. Today most Asians are no better off economically than they were back in 1939. On the other hand, the real income of the average American has almost doubled. As a result, the real income of the average Asian—always small by our standards—is now only a tiny fraction of that of Americans.



The chart shows that, at the outbreak of World War II, the real income (that is, actual purchasing power of income) of the average American was substantially higher than the average European's and much higher than the average Latin American's or Asian's. Since then, the European and Latin American have become better off. But the improvement in the economic lot of the average American has been so great that the others have been left far, far behind.

It must be remembered that the figures used to construct the chart are of varying quality. The fact is that few of the poorer countries have reliable statistics. However, it is generally agreed among competent observers, that the figures here presented offer a correct impression of the wide disparity in the average of real incomes between various parts of the free world. The figures, of course, have nothing decisive to say about spiritual and cultural values. In these, coun-

tries with relatively little material prosperity may be rich.

It is possible to draw a variety of morals from the story of lagging growth of income in other parts of the world. For one thing, it reflects the dynamic force of private enterprise. Private enterprise is characteristic of our economy far more than it is of most of the other free economies. The chart also reflects the fact that we are bountifully blessed with the natural resources essential to a high level of real income. Moreover, we did not suffer from the devastation and waste of two world wars as did many of the other free nations.

Narrowing the Gap

But perhaps the most important message which the chart conveys is one of warning. It warns that something must be done to narrow the gap in prosperity between America and other parts of the free world, if that world is to be united successfully in the struggle against totalitarian Communism. Writing in the HARVARD BUSINESS REVIEW, Kenneth E. Boulding recently put it this way:

> *"The crux of the problem is how to raise the three-quarters of the world that live on a low level to the high level of the other quarter, for it is precisely this wide disparity that makes our world so unstable. American-Russian relations, for instance [are] . . . complicated almost unbearably by the fact that each power is competing for the support of the vast fringe of underdeveloped countries . . . These countries are dissatisfied with their present state and are hovering between the two cultures, wondering which offers them the best chance of shifting from their present low-level to a high-level economy."*

Very real danger threatens from any feeling which may develop in the less fortunate free nations that our enviable economic progress has been made at their expense. Instead of viewing the American economic system as a model that might be followed by their own countries, they may be led to see in it a menace to their well-being. If Communist propaganda can persuade these people that their alliance with the free world will only result in their dropping farther and farther behind an increasingly prosperous United States, they will be driven to the side of totalitarianism.

Test of Effective Leadership

How can these free nations on the lower half of the income ladder be helped to alleviate the conditions that keep them there? Surely this question poses a whole series of complicated problems. Yet, if we do not exercise some effective leadership toward their solution, we can be sure that Russia will take advantage of the situation. In these circumstances, it is essential to both the stability and security of the free world that we help our less prosperous neighbors make satisfactory headway.

This does *not* mean that the United States should sacrifice its own economic progress in favor of some sort of global leveling scheme. On the contrary, a continually expanding and stronger economy is essential if we are to provide any real aid to our friends. Also, it goes without saying that our friends must be disposed to do all they can to improve their own economic position, if our cooperation to that end is to be effective.

Great Skill Required

Our part in a program to achieve this goal calls for a high degree of skill and statecraft. It involves international trade policy, which, in itself, presents a perplexing range of problems. It involves also programs of foreign technical and economic assistance. And expanded foreign investment must play a key role in a balanced program to strengthen the economies of the free world for our common good.

The Commission on Foreign Economic Policy, headed by Clarence Randall, has recently submitted a report, embodying the results of a monumental inquiry into our foreign economic relations and measures to improve them. From the very nature of the subject, discussion of the report is bound to be attended by much controversy and conflict. However, an awareness of the facts presented by this chart should inspire us to accord to the problems posed by the Randall Commission the careful and sober consideration they must have if any real progress is to be made in raising the general standards of human well-being throughout the free world. Our willingness and ability to do this have now become the real test of our statesmanship, both at home and abroad.

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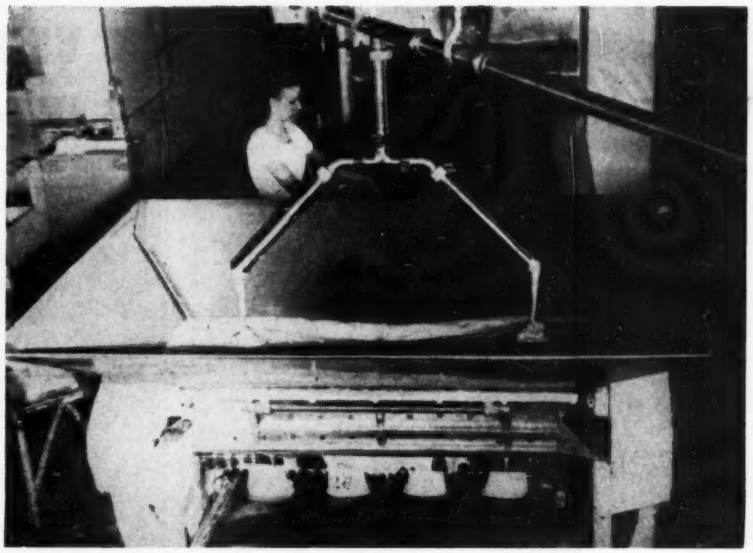

PAYS BIG—Equipment to produce cake batters continuously returns 31.81% on investment—when correctly figured. Batter flowing steadily into pan filler is made in a Votator.

Two case histories illustrate factors that must be considered if you are to avoid misleading answers and unfortunate decisions

FE STAFF

Calculating Equipment Payoff

How soon will a new and better piece of food factory equipment pay for itself?

How much profit are you losing annually by not investing in the new machine?

These are vital questions in this era of fast engineering advance in the food industry. And the need to come up with precise answers is sharpened by the profit-squeeze–out of which all food companies are trying to wiggle by cutting costs through higher efficiency.

And it is sad to relate that very few food manufacturers are adept at calculating the engineering economy of modern methods. Trouble is that they aren't sufficiently thorough–they don't take all cost elements into consideration. Too many appraise only the major direct savings, such as reduction in direct labor costs on the process line.

We therefore asked a well-known food engineering and equipment firm, The Girdler Co., to give us examples of engineering economy calculations –samples which take details into account. And we present here two sets of data (see tables).

The first compares the costs of cooking starch jellies by the conventional batch kettle method with those for producing the product by the new continuous Votator starch-jelly process.

Operating costs for the two methods are broken down into expenses for electric power, steam, direct labor, fringe benefits, maintenance, and building space. (Turn page)

TABLE I—Continuous vs. Batch for Starch Jelly

Cost comparison per 1,000 lb. of starch jelly produced.
Based on 31,500 lb. a day, 8-hr. shift, 225 operating days annually.

	Batch Kettle Method	Votator Continuous Processing Method	Difference
I. Operating Costs			
A. Utilities			
1. Electric power ($0.0133/kwh.)	$ 0.3238	$ 0.2762	$ 0.0476
2. Steam:			
Cooking $0.9423		$0.0940	$0.8483
Drying gum $0.1565		$0.0000	$0.1565
Drying starch $0.2600		$0.0659	$0.1941
	$ 1.3588	$ 0.1599	
Total Utilities	$ 1.6826	$ 0.4361	$1.2465
B. Direct labor			
1. Employees $6.4422		$5.7322	
2. Fringe benefits $1.1081		$0.9860	
Total labor	$ 7.5503	$ 6.7182	$0.8321
C. Maintenance	$ 3.2135	$ 1.6936	$1.5199
D. Rent (bldg. space)	$ 1.8010	$ 1.1290	$0.6720
Total direct operating cost	$14.2474	$ 9.9769	$4.2705
II. Capital Costs	($233,522.00)	($145,960.80)	
Depreciation	$ 3.7000	$ 1.9500	$1.7500
III. Indirect Costs			
Factory administration & other overhead	$ 4.8909	$ 4.8909	$0.0000
SUMMARY			
I. Operating Costs	$14.2474	$ 9.9769	$4.2705
II. Capital Costs	$ 3.7000	$ 1.9500	$1.7500
Total Operating & Capital Costs	$17.9474	$11.9269	$6.0205
III. Factory administration & overhead	$ 4.8909	$ 4.8909	$0.0000
Total Direct and Indirect Factory Operating Costs	$22.8383	$16.8178	$6.0205

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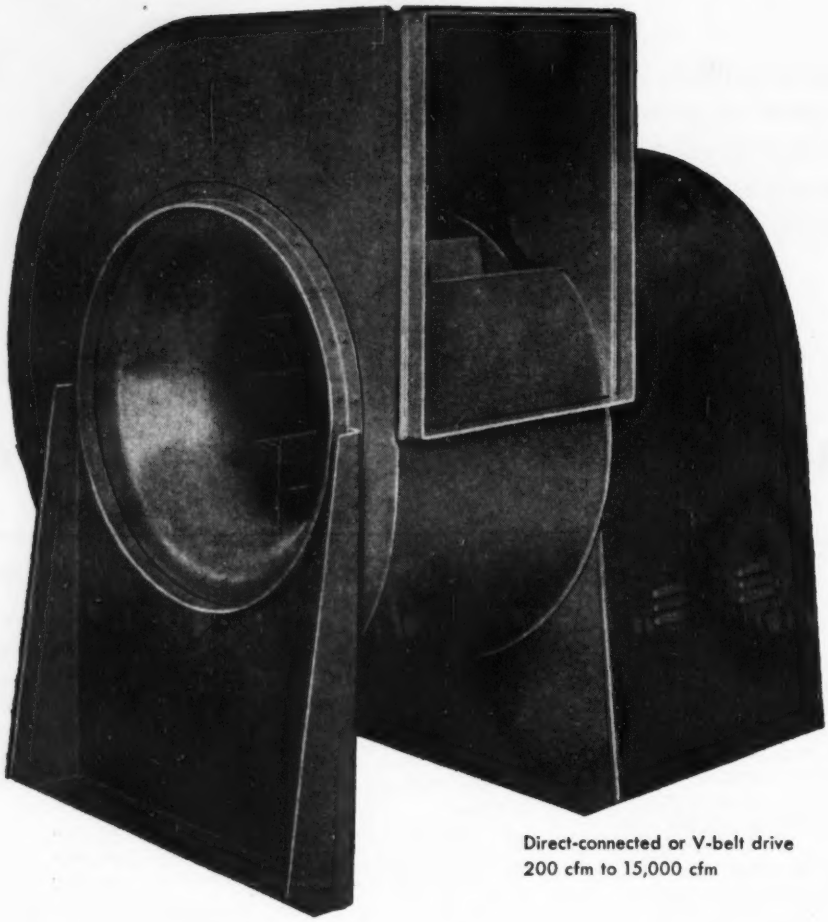
ALL-PURPOSE VENTILATING SETS YOU CAN PUT INTO SERVICE FAST!



Direct-connected or V-belt drive
200 cfm to 15,000 cfm

Here's a new line of Westinghouse motor-driven ventilating sets. They are ideal for general purpose ventilation, for exhaust, for processes, and for removal of heat, fumes and vapor.

Where changing plant or building conditions create an unexpected need for ventilation, these sets are a quick solution. Here's why:

COMPACT SIZES—down to 10" x 12" x 16"—take little space, are easy to install.

SINGLE UNIT—fan, motor and drive all made and assembled by Westinghouse.

DIRECTION OF DISCHARGE—can be changed on the job.

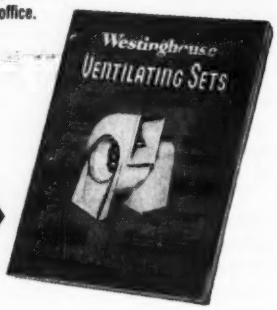
LOW MAINTENANCE permits use of out-of-the-way locations.

WEATHERPROOF COVERS permit outside installation.

SHORT DELIVERIES get your job started sooner.

These ventilating sets are low in first cost, low in operating cost. You get a single warranty because fan and motor are both built by Westinghouse.

For other exclusive features and full information, ask for Catalog 1160. Call your local Westinghouse-Sturtevant office. Or, write Westinghouse Electric Corporation, Sturtevant Division, Hyde Park 36, Massachusetts.



WESTINGHOUSE AIR HANDLING

J-80317

YOU CAN BE SURE ... IF IT'S Westinghouse

The figures are for 1,000 lb. of starch jelly, and the cost calculations are based upon production of 31,500 lb. a day, an 8-hr. shift, and 225 operating days annually. Direct operating cost saving for the new method amounts to $4.27 per 1,000 lb. of starch jellies produced.

In addition to operating expenses, calculations were made for capital costs (or depreciation) for the two methods, as well as for indirect costs, which include factory administration and other overhead.

When all of the factors are taken into consideration the saving achieved by the continuous method jumps to a $6.02 per 1,000 lb. of product produced.

Had any of these cost factors been omitted, a true picture of the engineering economy involved would not have been developed. And the food firm involved might have short-changed its future by making a wrong decision regarding the purchase of better equipment.

And while it can't be measured in dollars and cents, the better quality control and sanitation inherent in the new process is of significant value—a nice bonus. And the same goes for the better labor relations that come from making operations easier and neater.

Making Cake Batter

Now let us look at a second engineering economy study which gives you an excellent example of how to really figure the labor costs for two different methods.

It pertains to the production of cake batter by the Votator continuous mixing method as compared with the conventional batch technique.

Note how fringe benefits are figured in—and completely. They take these costs into consideration: Workmen's compensation, Federal payroll tax for social security, state unemployment fund, group insurance, vacation, holiday pay, relief periods, uniforms, and laundering of uniforms.

Then for the night shift, a 5c. per hour premium is added.

Annual labor savings hit the comfortable total of $6,806.04.

This study also specifies the annual recovery of invested capital required and subtracts that from total savings to give a figure for the annual net return on the investment.

Then it shows that the net return of $4,792.31 yields a rate of annual return on the investment which amounts to no less than 31.81%—a rather profitable venture.

Yes failure to make a thorough engineering economy study of a new versus an existing operation likely will lead you to a wrong and costly decision. And it may impede your progress by postponing modernization. Or it may cause you to make an unwise investment in something that merely looks good upon superficial analysis.

Keep this in mind, too: In some applications of improved food manufacturing equipment, the payoff comes in higher sales and profits which result from improved quality, or more uniform quality. This often more than justifies the investment, even when there is no saving in labor, materials, or general overhead.

Or the ability to match the quality of a competitor's product and avoid loss of business may be the thing that justifies the cost of better methods.

TABLE II—Old vs. New Cake Batter Process

Comparison of costs of producing cake batter by the former batch method and the present method employing Votator cake batter apparatus. The latter includes mixing tank, pump, air compressor for aerating and processing unit with three 4-in. cylinders. Total cost: $15,000. Company produces 10,000 lb. of batter in 8 hr.

Labor Costs	Conventional Batch Method	Method Employing Votator Apparatus
Direct labor cost per hour on day shift	$6.37	$4.79
Fringe benefits per hour on day shift	$1.1756	$0.8817
1. Workmen's compensation	$0.0648	$0.0486
2. Federal payroll tax for Social Security	$0.0864	$0.0648
3. State Unemployment fund	$0.0752	$0.0564
4. Group insurance	$0.0452	$0.0339
5. Vacations (two weeks)	$0.2528	$0.1896
6. Holiday pay	$0.1516	$0.1137
7. Relief periods	$0.4212	$0.3159
8. Uniforms	$0.0184	$0.0138
9. Laundry of uniforms	$0.0600	$0.0450
Direct labor cost per hour on night shift	$6.37	$4.79
Fringe benefits per hour on night shift	$1.3756	$1.0317
1. Same as per day shift, plus night shift premium of 5c per hour.		
Total labor cost per day shift hour	$7.5456	$5.6717
Total labor cost per night shift hour	$7.7456	$5.8217
Total cost of 300 8-hr. day shifts per year	$18,109.44	$13,612.08
Total cost of 300 4-hr. night shifts per year	$ 9,294.72	$ 6,986.04
Total annual labor cost	$27,404.16	$20,598.12
Total annual labor savings (difference between $27,404.16 for former batch method and $20,598.12 for operation of present apparatus)		$ 6,806.04

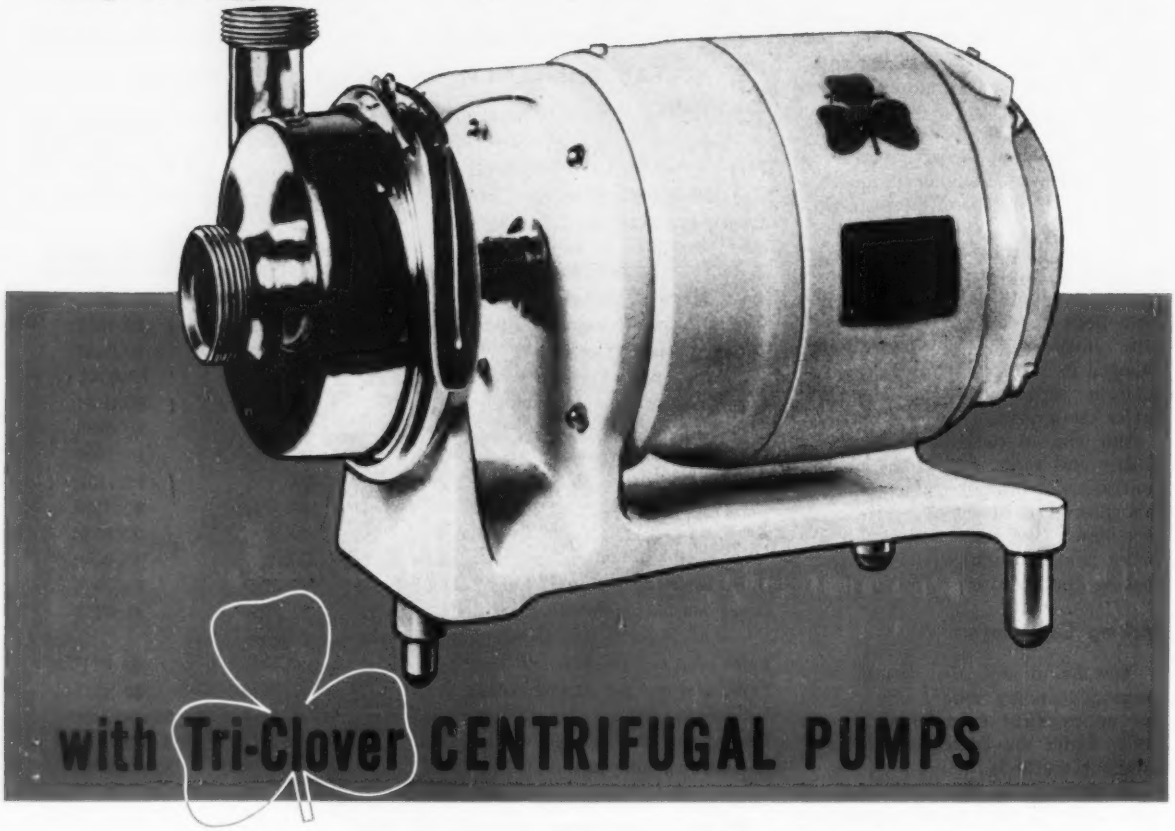
Return on Investment

Desirable annual rate of recovery of capital invested, based on 10-yr. amortization	$ 1,500.00
Amount recovered annually tax-free by 20-yr. depreciation schedule (½ of above)	$ 750.00
Additional amount to be recovered annually out of profit	$ 750.00
Earnings required annually before taxes (at 45%) to recover above amount (above figure divided by 55)	$ 1,363.63
Annual recovery required over 10-yr. period; $750.00 from depreciation plus $1,363.63 from profits before taxes	$ 2,113.63
Total annual savings	$6,806.04
Required annually for recovery of capital	$2,113.63
Annual net return on investment	$4,792.31
Rate of annual return on capital invested; annual net return of $4,792.31 divided by $15,000, the cost of the Votator apparatus	31.81%

Supplemental Data—Employees and Day Wage Rates

	Conventional Batch Method	Method Employing Votator Apparatus
Dough mixer	$1.68	$1.68
Dough mixer helper	$1.53	$1.53
Depositor operator	$1.58	$1.58
Ingredient scaler	$1.58	$0.00

You Get More for Your Money



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These are just a few of the advantages you get when you specify TRI-CLOVER Centrifugal Pumps. These modern, high efficiency units are backed by years of specialized experience, and are available in a full line of sanitary and industrial types to meet practically every corrosion-resistant pump requirement.

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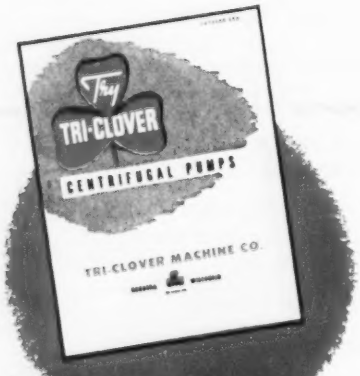

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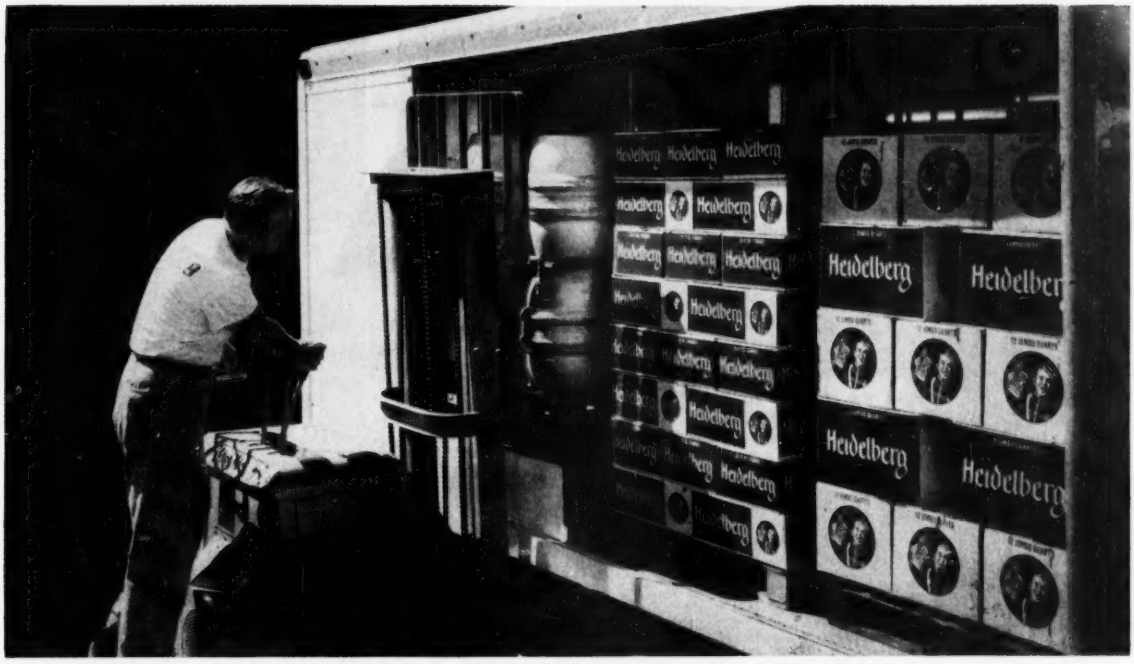


WAREHOUSEMAN completes load with 8-keg pallet. Note pipe dividers that keep units in proper position.

Beer Handling Speeded

Palletized operation employing special bodies and lift-truck enables one man to unload and reload an entire 6-truck fleet

JIM FERGUSON
Special Correspondent, Portland, Ore.

A new high in materials handling efficiency has been reached at Portland (Ore.) Beer Distributors, Inc., where one warehousemen can now unload and load a beer truck in less than 15 min.

Secret of the speedy operation is use of a Mobilift stand-up lift truck, with 83 in. mast, and route trucks equipped with bodies specially designed for beverage delivery.

The bodies, named Work-Savers, and distributed by the Work-Saver Body Co., Cleveland, have movable pipe partitions that divide them into compartments for eight standard-size pallets. Sliding doors on sides and rear make for easy loading and unloading.

Speed Case Handling

Bodies were designed to facilitate quick loading at distributors' warehouses and, also, to make the routemen's work easier and faster through ready availability of all packages.

In Portland's operation, basic loads are made up on 4-way 32 x 40 in. pallets. Unit loads consist of 70 cases of cans, 56 cases of stubbies, 35 cases of quarts or 8 kegs. Kegs are double-decked with a plywood sheet between the two layers. All package goods comes from the brewery on pallets and empties are returned the same way. Kegs are palletized as they come off the brewery truck and prior to going into the refrigerated room.

How System Operates

Upon arrival in the morning, the warehouseman makes up two assorted pallet loads of the less popular case items for each route truck. Makeup of these pallet loads is based on sales records from the previous month. These are moved to an area where they are convenient for loading onto delivery trucks on their return.

When trucks return to the warehouse, drivers do not handle the returns, but park the trucks and check in. The warehouseman spots each truck and unloads it with the lift truck, checking empties and returns.

After a truck is completely unloaded, he reloads it, using the two previously prepared pallets of assorted goods and five additional ones. Although the body has space for eight loaded pallets, an empty one is usually placed in one of the back compartments to enable the driver to start stacking cases of empty bottles at his first stop.

The same procedure is followed until all route trucks are loaded and ready for the drivers to start the following morning.

Normally kegs are not included in loads of package goods—the distributor uses one or two trucks exclusively for them. The same palletizing procedures are used for these trucks.

The Work-Saver body is 14 ft. 5 in. long x 8 ft. wide with a height of 6 ft. at the doors. It is engineered to fit any standard 102-111 (cab to axle measurement) truck chassis. The movable partitions make the body adaptable to both palletized and bulk loading for many different products.

In handling bulk products, partitions may be removed, to enable loading from rear of body.

...some people compete the hard way

...others specify

Smart producers realize that after all the thought, time, and money invested in manufacturing a better product...it pays to package it more attractively and sell it easier and faster in a Chase bag. Here are a few Chase products designed to do JUST THAT!

CHASE PAPER BAGS AND MULTIWALL BAGS...

Chase "family-size" rice, sugar, and flour bags are colorfully printed to help SELL your product. Chase Multiwall bags are the ideal *low-cost* bags for packaging practically any product.

CHASE POLYTEX PLASTIC BAGS

Housewives buy what they see. Your citrus or produce packed in Chase polyethylene bags will look better—sell faster. Colorfully printed bags available in all sizes.

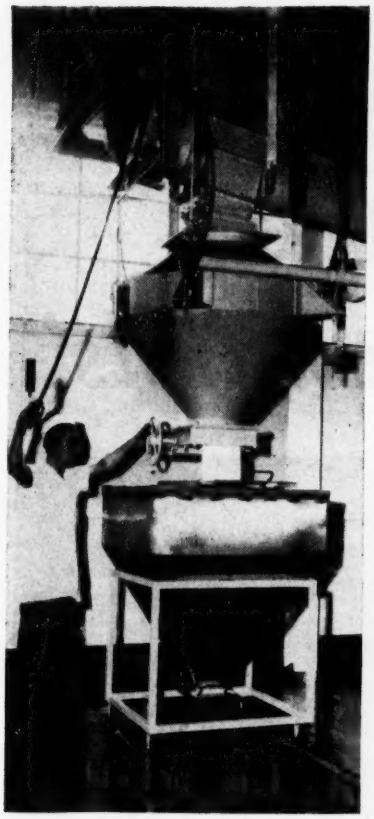
CHASE VISION-AIRE BAGS

Chase VISION-AIRE bags are designed to advertise your brand yet provide the necessary ventilation to keep potatoes fresh. Specify VISION-AIRE bags on your next order of packaged potatoes. It costs no more to get the best!

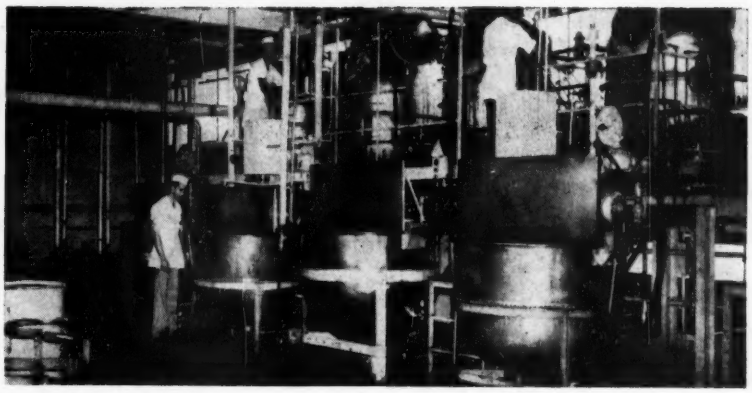
Ask your Chase Bag representative for free samples and current prices.

CHASE BAG COMPANY

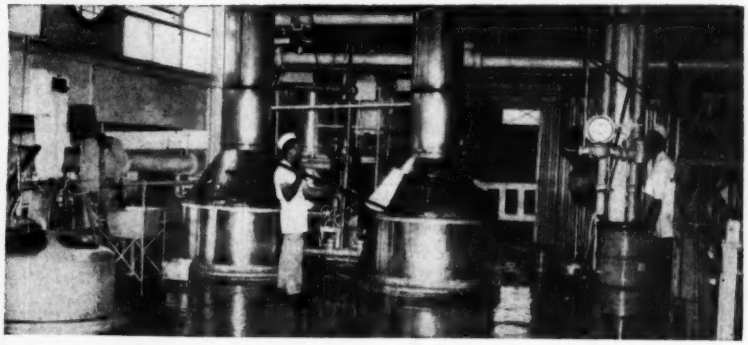
General Sales Offices: 309 W. Jackson Blvd., Chicago 6, Ill.
30 BRANCHES AND SALES OFFICES STRATEGICALLY LOCATED



BULK SUGAR-HANDLING system augments process efficiency.



IN THIS spanking-new cook room, ingredients for making preserves are premixed in jacketed kettles, then finished in vacuum pans on platform.



APPLE BUTTER is made in these cookers. After pumping in clear pulp, corn syrup and other lab-checked ingredients are metered in for right blend.

BATCHES *WITHOUT* BOTCHES

—are attained by midwest preserve manufacturer through installation of control lab, mechanized sugar-handling system, and efficient batch room for precise scaling and feeding of ingredients into kettles and vac pans

FLOYD A. LEWIS
Corn Industries Research Foundation, Inc., New York City

Advanced equipment recently installed at the Orrville, Ohio, plant of The J. M. Smucker Co. achieves striking new precision in preparing quality preserves.

Thus, the risks of "botching a batch" have been cut to an all-time low.

Noted for the consistently high quality of its products, this firm ranks as one of the largest independent preserves in the country Operations are under continuous inspection of the USDA, which means that its products are prepared and packed under highest standards of plant sanitation.

Installations just completed at the plant include: (1) A laboratory to serve both quality-control and research needs, (2) an entirely mechanized system for handling dry sugar, (3) batch room to facilitate weighing and handling of ingredients, and (4) new warehouse to improve storage of finished goods and speed deliveries.

Smucker is justly proud of its roomy, light and airy, pleasant-to-work-in laboratory. In appearance, it resembles a large kitchen with neat enameled cabinets lining inner walls, and glass brick in the exterior wall. In the center of the glass brick panels are windows that may be opened. Walls of the new laboratory are painted a pleasant shade of green, and the floor is covered with a darker green vinyl tile.

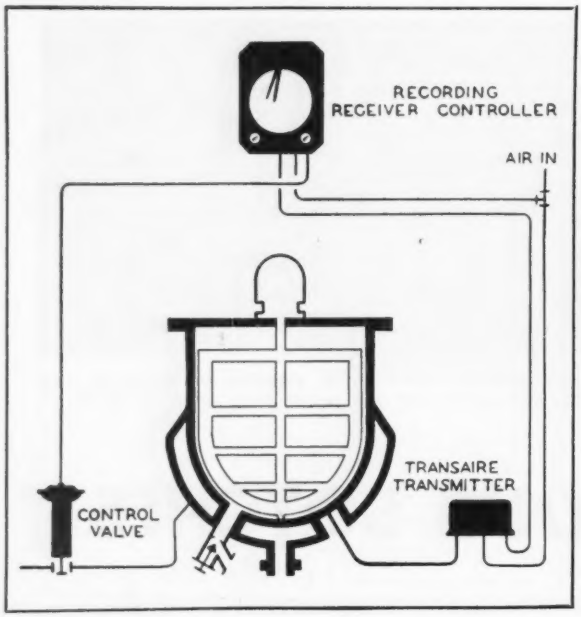
The lab is fully equipped to handle all routine tests for controlling product quality as well as for carrying out research on new products. Space is provided for a USDA representative, who inspects and grades every batch of the company's products.

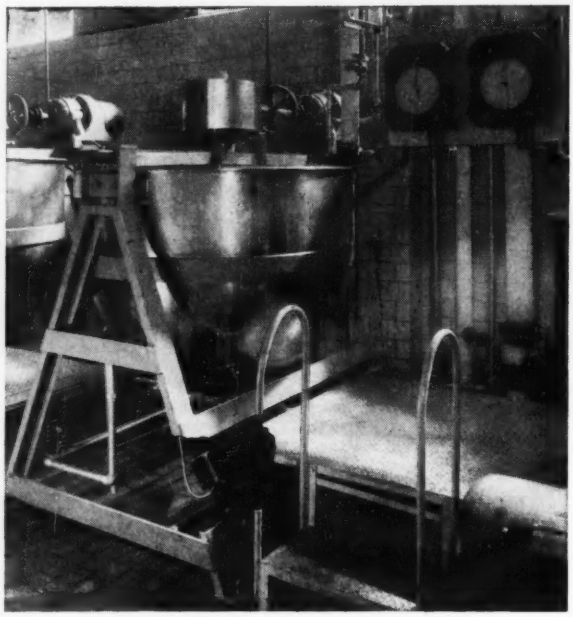
Sugar Handling Simplified

Additions to the plant buildings were required for the new sugar-handling system and batch room. With the present sugar setup, shipments are received in special railroad hopper cars, which are run directly into a new unloading station inside the plant. From these cars, sugar is dumped into a bin underneath. Enclosed screw conveyors carry sugar from this bin into three 100,000-lb.-capacity cylindrical storage bins. Addi-

LaRosa SAYS:

"This jacketed-kettle control *really controls*"





"We never dreamed it was possible to get such accurate temperature control in our agitated kettles", reports Mr. Vincent P. LaRosa, Vice-President of V. LaRosa & Sons, Inc. "This Taylor control system really protects our name for high quality spaghetti sauces and what's more it does it automatically and surely. It cuts our operating costs and there's no chance of human error. We like it so well we're now ordering our fifth system".

The Taylor control system that Mr. LaRosa is so enthusiastic about is without doubt the most accurate yet devised for jacketed kettles. As shown in the drawing above, the heart of this system is the Taylor TRANSAIRE* Temperature Transmitter. Here's why: **1.** The temperature-sensitive bulb of the TRANSAIRE Temperature Transmitter is flat and flush with the inside surface of the kettle—no accumulation of processed material around bulb to foul up heat transfer; no need to modify paddles to clear bulb, resulting in better quality yield. **2.** This compact super-responsive instrument, with its small, flat bulb, has an unprecedented speed of response thanks to derivative action (SPEED-ACT*) in the measuring circuit. It will transmit an output pressure proportional to the measured temperature with an accuracy of plus or minus ½° F. **3.** The Fulscope Recording Receiver Controller capitalizes on this high responsiveness to give precision control. And LaRosa have a minute by minute chart record of their kettle temperatures.

There's a Taylor control system designed to cut costs and improve product quality on most every canning process. Just call your Taylor Field Engineer, or write for **Catalog 500.** Taylor Instrument Companies, Rochester, N.Y.; Toronto, Canada.

*Reg. U.S. Pat. Off.

Taylor Instruments
MEAN ACCURACY FIRST

For more information, use coupon on page 159.

tional enclosed screw conveyors carry sugar from these bins to the new batch room.

Here, sugar is discharged into a 5,000-lb. surge bin, in which the sugar level is automatically maintained. From surge bin, other screw conveyors carry sugar to a 1,000-lb. capacity weighing-scale hopper.

The batch room is provided with facilities for receiving and weighing all ingredients going into products. It is housed in a new building adjacent to the cook room. Ingredients are automatically weighed and introduced into stainless steel hoppers, which are handled by an overhead tramrail leading directly to kettles in the cook room.

Formerly, these operations were carried out in the cook room, with sugar received and handled in 100-lb. multi-ply paper bags. Use of the new batch room greatly facilitates the handling and preparation of raw materials for the cooking operation. This improved materials handling arrangement also reduces labor required in batch preparation.

Specially-Built Warehouse

The new warehouse was designed to facilitate handling and shipping of finished products. Since 85% of the production is shipped by truck, special attention was devoted to simplifying this type of shipment. For example, the loading dock is large enough to accommodate eight large trailer trucks at a time. The warehouse is constructed with a 13-ft. high solid brick outer wall, at the top of which are windows extending completely around the building periphery.

All finished goods are packed in corrugated shipping cases that are completely palletized. The warehouse is designed for stacking loaded pallets only three high, since higher stacking usually results in some glass breakage. Special attention is given to arrangement of stock. Large aisles promote easy movement of motor-driven fork trucks handling pallets. Storage is arranged so that the oldest merchandise is moved out first.

Featured by old-fashioned cider apple butter, Smucker's product line includes a full assortment of fruit preserves and jellies and apple-base jellies. More recent additions are "ice cream dressings" and "pastry fillers." Most of the apple butters, jellies, and preserves goes into consumer-size units. The remainder is bulk packed in commercial and institutional containers. Ice cream dressings are also packed for the consumer trade, but pastry fillers are put up in 50-lb. pails and drums for the baking field.

Like other quality preservers, Smucker uses granulated sugar and corn syrup in practically all of its products. Like other preservers, it reports these advantages in using corn syrup: (1) Virtual elimination of sugar crystallization in products, (2) less masking of natural flavors by the sweetener, and (3) improved appearance of products.

West Coast Plants

In addition to the main plant in Orrville, the firm operates a fruit-processing plant in Wenatchee, Wash., and another in Oregon City, Ore. At all three plants, fruit is processed in season. Fruit packed at Oregon City is also under continuous inspection of the USDA. After freezing it is shipped to Orrville to be held in refrigerated storage until used.

Some fruit processed at Orrville likewise goes into refrigerated storage for later use. Apples are dehydrated at Wenatchee and shipped to Orrville for employment when fresh apples of good quality are unavailable.

Fruits processed in both West Coast plants and at Orrville are packed almost entirely in 50-gal. steel drums fitted with disposal polyethylene liners. Drum covers are also fitted with polyethylene liners designed to eliminate leakage of sealed drums. Use of plastic liners, of course, permits re-use of drums.

There are two refrigerated storage rooms at Orrville. The larger, maintained at a sub-zero temperature, holds 10,000 drums of frozen fruit. The smaller cold room is held at 25 deg. F., and accommodates 2,000 drums of apple concentrate. Electric fork trucks handle the drums in the storage rooms and transport them to the batch room when ready for use.

A specially designed dumper empties drums. It is mounted on casters so that it can be easily moved to any desired position. The dumper lifts the drum to the desired height, then tips it so that contents are readily emptied.

Apples must be handled fresh and used largely as received. At Orrville, fresh apples are received in outdoor concrete bins from which they are flumed by water through concrete sluiceways into the plant. Apples are first treated to remove any spray residue, washed, and then conveyed over inspection tables.

Sound apples passing inspection are fed into a hammermill, and the pulp from this mill is then pumped to kettles in the cook room. After cooking, pulp goes through cycloners, which are essentially large mechanically driven colanders that separate seeds, hulls, skins, stems, and fibrous seed enclosures from pulp. Clear pulp is then pumped into the apple butter kettles, where other ingredients are added for further cooking.

Dehydrated apples are prepared in the form of slices, which are packed in multi-ply paper bags and palletized for storage. When ready for use, slices are moved into cook room, where they go directly into the cookers. In some cases, they are blended with fresh apples.

Corn syrup is delivered to the plant in railroad tank cars, from which it is pumped into two 10,000-gal. vertical cylindrical storage tanks installed in a separate room. These tanks are fitted with steam coils that maintain temperature of the syrup at about 100 deg. F. to facilitate handling. The plant hot-water storage tank is located in the same room, which also helps to keep the syrup warm.

From storage tanks, corn syrup is pumped either to the cook room or to the batch room via stainless-steel jacketed piping. Flow is metered so that once the pump is started it will automatically stop after the pre-set amount of syrup has been passed. Pumping is controlled from push-button stations in both the cook and batch rooms.

Rigid Control

Quality control at Smucker's starts with the raw materials and extends all the way to the retailers' shelves. To begin with, top-grade ingredients are purchased, tested, and inspected to insure conformance with standards. Inspections are made by a plant chemist charged with the responsibility for carrying out the entire quality-control program, and by a USDA representative, who carries out inspections and tests for grading purposes.

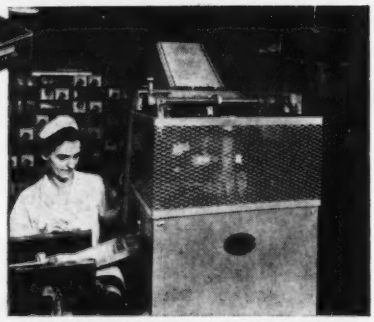
Cooking and other production procedures are standardized so that the men in charge can apply the necessary controls at various process stages. Any changes in plant procedures are made through the quality-control laboratory.

Equipment is designed so that test samples can be taken readily at any stage. Cooking temperature may be set at any desired point, after which it is automatically controlled. Cooking time is entirely under the control of the operator, since it somewhat varies with raw materials. A refractometer is used to determine when vacuum-pan batches of preserves and other products are finished.

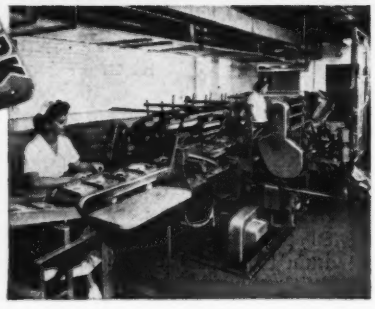
Final quality adjustments are made after cooking is complete. When the product passes final inspection, it flows to the floor below, where it is machine-packed in glass jars of vari-

How CLARK speeds up packaging ...keeps costs down

Individual Clark bars are wrapped by "Package" Model DF-1 machines. Each machine has a speed of 120 bars a minute. Forms a box-like wrap over the most irregularly shaped bar.



Cardboard trays for Clark's multiple-unit packages are formed from inexpensive die-cut blanks by a "Package" Tray-Lock machine. With this machine, sturdy trays can be made at speeds up to 90 a minute.



Trays containing six Clark bars are overwrapped in colorful printed cellophane by a "Package" Model FA. Most widely used machine in the packaging field, the FA has a speed of 100 packages a minute.

YOUR package and your costs

With 40 years of service to leading package goods manufacturers, we have the *experience* and the *machines* you need to cut your costs. We may also be able to improve the sales appeal of your package. Many of the modern techniques in packaging were pioneered by "PACKAGE" designers and engineers.

Consult our nearest office.

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NEW YORK PHILADELPHIA BOSTON CLEVELAND CHICAGO ATLANTA
DALLAS DENVER LOS ANGELES SAN FRANCISCO SEATTLE TORONTO MEXICO, D.F.

ous sizes with vapor vacuum seal caps. After jars have been packed and sealed, they are fed through a continuous pasteurizer, then cooled by a water spray, dried, labeled, and packed in corrugated shipping cases.

Quality control doesn't end after cases are sealed. Every effort is made to be certain the consumer gets the freshest possible product. Insofar as possible, goods are practically processed to order. Production and shipping schedules are organized so that shipment to the customer can be made within a short time after the product is packed. Retailers are urged to place their orders so as to minimize storage time.

Other Plant Features

Smucker goes to great pains to make its plants pleasant working places. At Orrville, for example, the color scheme of the plant interior is now green instead of the former white. Different shades of green are used for walls and various pieces of equipment. Not only is this color scheme more comfortable to work around, but it maintains a good appearance longer than the former white.

In addition to products labeled with its own brand name, Smucker packs a small amount of private-brand merchandise. To simplify production of this merchandise, the company operates its own label-print shop.

While the present program is now essentially complete, in a sense modernization is never finished. The company is always alert to new equipment or methods that will improve its product or advance its processes, and it carries on research directed toward development of new products. These factors, together with the high standards of quality and sanitation, serve to keep the firm ever in the forefront. —*End*

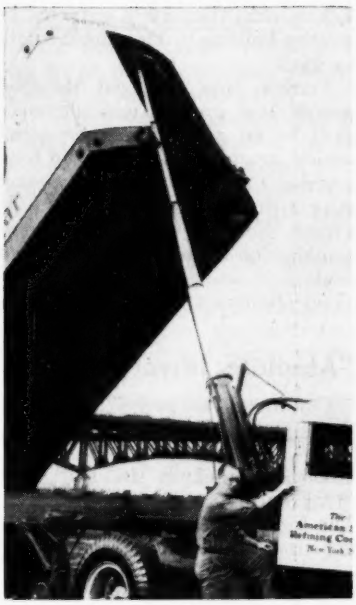
Bulk Sugar by Trailer

—*Continued from page 71*

Payloads carried on the older 1939 and 1940 straight trucks ran approxi- on the present day units. But loads per axle were greater than on vehicles today. Actually, the change from a straight truck to a tractor-trailer was made mainly to facilitate maintenance and cleaning.

In two of the sales areas covered, New York City and Baltimore, the state motor vehicle laws permit carriage of larger loads with a change in equipment, though not in Massachusetts and Pennsylvania.

For example, the gross allowable



SET FOR ROAD, hydraulic hoist nests neatly into trailer-front recess.

PERFORMANCE of 4-part telescoping piston is seen as trailer is tilted to 45-deg. unloading angle.

laden weight is increased from 45,000 lb. in Pennsylvania to 63,750 lb. in New York by the use of a tandem-axle trailer in place of a single-axle trailer, and to 67,750 lb .in Maryland with the further substitution of a tandem-axle tractor.

The tractors employed are Macks, GMC's, Brockways, and Autocars. The latter carrier (Model C-70-TS with 148-in. wheel base and 11.00x22 tires) is illustrated in our photos.

The trailers used are Gramms, Heils, and Fruehaufs. Those shown here are the Fruehauf special bodies, approximately 20 ft. long, 8 ft. wide, and 6 ft. high, constructed of stainless steel, interlined and insulated, and having exterior square corners. The interiors are free and clear with no baffle plates. And there are rounded corners at front, rear, and sides to facilitate removal of sugar at destination.

Loading is through a roof manhole at the front. Unloading is by gravity through a sliding door at the rear.

The unloading hoist is a Gar Wood vertical hydraulic model with a compact four-part telescoping piston. Operation is by a pump on the tractor chassis.

With a 40-deg. angle of repose for dry granulated sugar, it provides a maximum body inclination of 45 deg., which is adequate for quick unloading.

All of the trailer dump bodies are loaded while in an elevated position on the trailer chassis (see first photo), so as to obtain a full load more readily.

No Exposure While Loading

In the Baltimore operation, loading is done outside of the refinery building from a second floor platform. However, there is no exposure of the sugar to the outside elements, or to contamination, since the filling is via a flexible boot connecting the spout of the sugar discharge pipe and the rim of the trailer manhole.

As for the use of tractor-trailer trains (a tractor plus semi-trailer, plus four-wheeled trailer) there are disadvantages. These trains are not permitted in Massachusetts. And in

PACKAGING SPECIAL COMING IN MARCH . . .

There's a highly significant trend to pouch packaging. What it means and how it is done will be spelled out in FE's Packaging Special next month.

Individual-service packages—another one to watch—will be discussed, too.

New tech info on use of dessicants in packaging will be presented.

And a practical how-to article will tell the way to reduce damage to packaged foods in shipment.

These are but a few of the eight or ten timely and helpful articles scheduled for the Packaging Special.

. . . PLUS OTHER ARTICLES FOR EVERYONE

Many other important developments will be covered in the March issue.

Among them will be: (1) Color measurement. (2) Taste instrumentation. (3) Management's new "radar" system, statistical quality control. (4) A nice bit of advanced food plant engineering. (5) Better maintenance methods. (6) Improved materials handling. (7) An outstanding suggestion system. (8) New equipment at the Canning Show. —*The Editors*

Is Contamination Costing you Money?

Airborne bacteria and mold, invisible to the human eye, swoop down on food exposed for even a fraction of a second. Filtering through sanitary precautions, these food plant demons contaminate products . . . impairing quality and flavor. They also cost you money through returns, scrapping and lost customers. Yet many processors have found a simple, complete answer in Westinghouse Sterilamps.

WESTINGHOUSE STERILAMPS are being used successfully in many industries where contamination due to airborne bacteria or mold WAS a problem. In just a few minutes, you can find out for yourself whether Westinghouse Sterilamps fit your specific needs.

WESTINGHOUSE LAMP DIVISION
Dept. FE2, Bloomfield, N. J.

Without cost or obligation, I would like to know more about how Westinghouse Sterilamps help control contamination.

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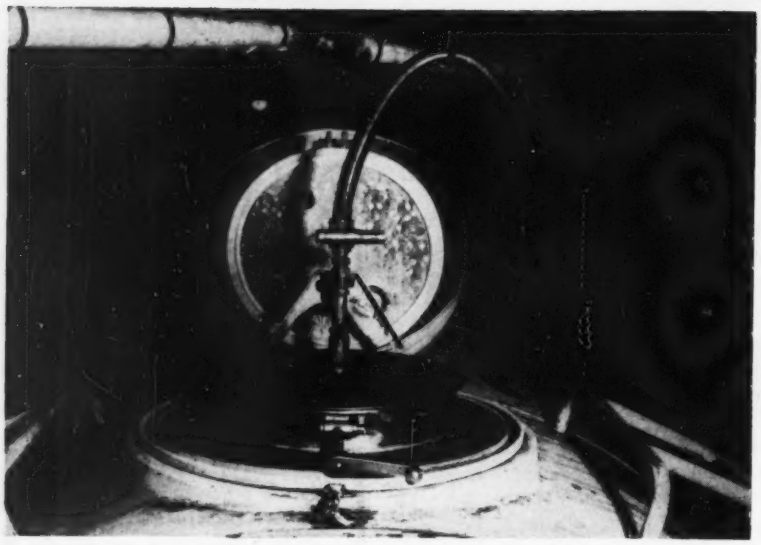
YOU CAN BE SURE... IF IT'S Westinghouse



How NEW Rotary Sprayer Cleans Tank Car Interiors in 1/10 Former Time

User of mechanical spray cleanser also saves on materials and hot water—he reports better results, too.

Cleaning the insides of a large over-the-road tank truck was extra tough at this well known edible oil refinery, because 1500 gallon tank compartments held tenacious heavy-bodied core oil, and also a mixed vegetable-fish oil. They had to be filled with water, charged with caustic, and boiled for 6 to 8 hours before dumping and rinsing. This cleaning method was time-consuming, hazardous, and not always too effective. Could Oakite help them?

The Oakite Technical Service Representative arranged a demonstration of the Oakite Rotary Sprayer. The unit was set into the tank opening and a 200°F solution of Oakite Composition No. 24 was sprayed at 90 lbs. pressure for 20 minutes. This was followed by a 180°F spray rinse. Then a five minute cold water hose rinse.

Results: Tank completely clean with a 6½ hour saving on time. Tremendous quantities of hot water also saved—plus a $15 saving on material for this one job alone.

Proving that... in industrial cleaning it always pays to consult Oakite.

MANY WAYS OAKITE CAN HELP YOU

Oakite offers over 80 specialized cleaning materials, up-to-the-minute methods and equipment, plus long experience—all of which make short work of sanitation in food plants. More information in this booklet. Write Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

Technical Service Representatives in Principal Cities of U. S. and Canada

Pennsylvania their use is restricted by a ruling limiting overall vehicle length to 45 ft.

Further, New York and Maryland specify that gross weight allowance shall be no greater for a three-unit vehicle (tractor, semi-trailer, and four-wheeled trailer) than for a two-unit vehicle (tractor and semi-trailer). As a result, the refiner considers the 3-unit combination unsuitable for its present work.

End (Resume reading on page 72)

"Absolute Insect Control"

—Continued from page 57

droplets of uniform size and shape (8-micron dia. and roughly spherical). The fog may be described as resembling cigarette smoke in character.

How It Performs

Using this system, the insect-killing fog fills the air space, penetrating cracks, crevices, and other insect hiding places. And because of the volatility of the odorless vehicle, there is no condensation on walls, floors, tables, equipment, or product, when operated according to instructions.

The insecticide comprises a base of completely deodorized, highly volatile petroleum hydrocarbon, together with pyrethrins 1 and 2, plus piperonyl butoxide. The latter is an activator, or synergist, that greatly increases the effectiveness of pyrethrins in insecticides. Tailored to operate correctly in the atomizers, the fog is economical, safe, and non-toxic to humans when properly handled.

Safety Angles

Regarding safety, two factors must be considered—toxicity and fire hazard. Brown & Haley learned that the flash point of the insecticide is sufficiently high to win approval of any fire department in the country. When fogged according to directions, the mixture runs only 1/40 of the concentration that is designated as the lower explosive limits.

In reference to toxicity, Dr. Arnold J. Lehman, chief, Division of Pharmacology, U.S.D.A., made this statement in July, 1948: "Combinations of pyrethrins with the two insecticide activators, piperonyl butoxide and n-propyl isome, appear to be the safest for use from all standpoints."

This has since represented a safeguard for the candy field, and eliminated much misinformation regarding relative safety of insecticides.

When properly engineered with this specially formulated insecticide,

each atomizer delivers fog at a rate of 10,000 cfm, to cover up to 100,000 cu. ft. of space in an enclosed area and kill all insects within.

Fourteen such atomizers are installed at B&H. Actuation of the main air pressure valve for only a few minutes assures complete insect control—sure performance at the operator's fingertips.

Prior to installing the atomizer system, Brown & Haley resorted to two complete cyanide-gas fumigations annually. And in the intervening periods, conventional means of control were exercised. Overall, the results were not satisfactory. But after operating the present atomizers for 1½ yr., management claims "absolute insect control."

Significant Economies

B&H had formerly paid approximately $1,500 for each cyanide-gas fumigation. In addition, the company purchased some $700 worth of mill sprays annually. Thus, the old control program cost $3,700 yearly. What's more, the plant had to be shutdown four days each year for the two fumigations.

Using the atomizer system, there are no production interruptions. The firm has spent $3,275.90 for insecticide and fumigant in 1½ yr., or approximately $2,183.93 per year.

Thus saved by the new system is about $1,500 annually, plus four highly valuable days of production. And in particular, the positive insect control—in place of the old "kill 'em when you find 'em" program—has spelled new progress in safeguarding the company's confections.

End (Resume reading on page 58)

Vanilla-Like Synthetic

—*Continued from page 85*

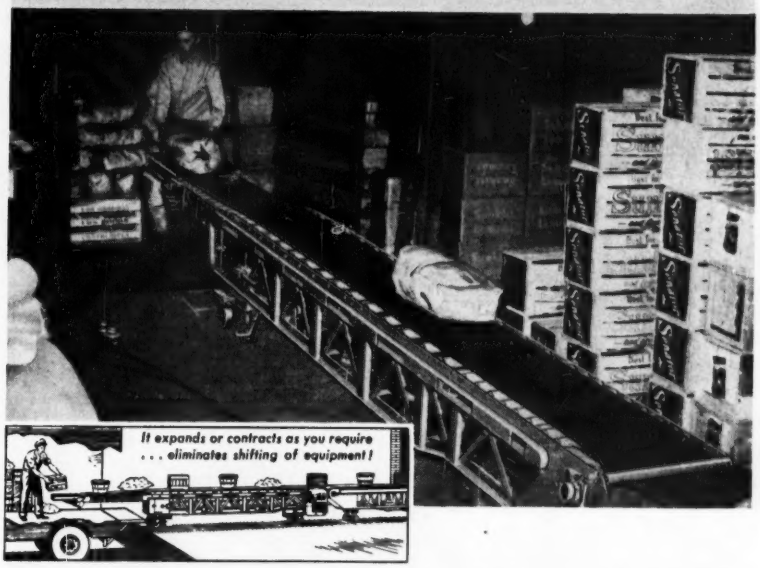
have a flavor that more nearly approached that of natural vanilla than when a combination with vanillin was used.

Chocolate, Fruit, Nut Ice Creams

The synergistic properties of Vanitrope in chocolate, fruit, and nut ice creams were observed. Basic mix containing different amounts was examined organoleptically, and it was concluded that approximately 0.0066g. per 100 lb. was sufficient to gain a pleasant base flavor for these ice creams.

When this amount was used in the mix, results indicated that it had a greater influence in enhancing the

IT S-T-R-E-T-C-H-E-S
or CONTRACTS as you need it!



VERSATILE FARQUHAR EXPAND-O-VEYOR
is completely adjustable in length
to meet your handling needs!

HERE's the revolutionary Farquhar Package-Handling Expand-O-Veyor—literally, the "conveyor with the two-way stretch." You can use it at its maximum length one day; then move it to another location and use it at minimum settings the next day. Use it in loading and unloading trucks—keep one end fixed and shorten or lengthen the other as your truck becomes full or empty. It is particularly suited for loading or unloading trucks with a fixed conveyor line. The versatility of the Farquhar Expand-O-Veyor makes it suitable for a wide variety of materials handling problems—especially where space and working requirements change often.

For more information on Farquhar portable, semi-permanent, and permanent power driven or gravity conveyors, write our engineering department, stating your problems. We'll be glad to consult with you . . . at no obligation, of course.

Roll Along to Lower Costs—with Farquhar Gravity Conveyors.
Available in a variety of widths, wheel patterns, roller diameters, roller spacings, and types of connectors, in either Black Velvet or Standard finish—to meet your particular needs.

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CONVEYORS
POWER-BELT AND GRAVITY CONVEYORS

FREE! Package-Handling Catalog showing all the cost-cutting, production-speeding Farquhar Package-Handling Conveyors.

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THE OLIVER CORPORATION
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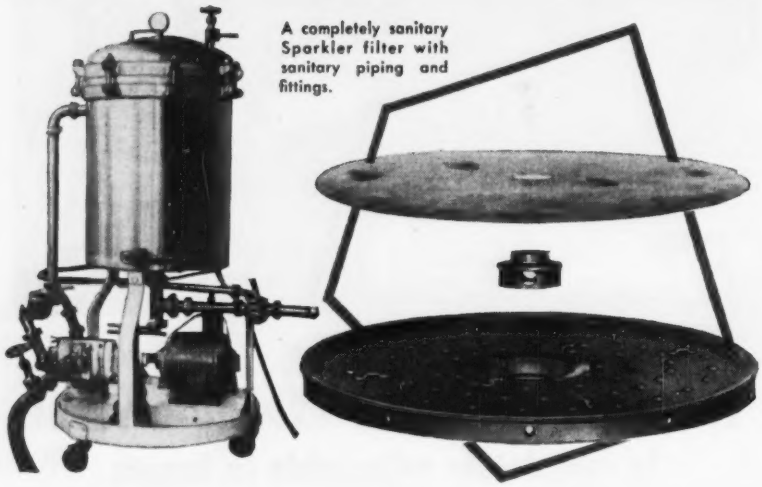
Gentlemen:
Please send me my free copy of the Package-Handling Catalog.
Name ----------
Firm ----------
Address ----------
City ---------- Zone ---------- State ----------

For more information, use coupon on page 159.



A completely sanitary Sparkler filter with sanitary piping and fittings.

You can see at a glance why Sparkler filter plates are the most sanitary plates ever designed.

All surfaces, inside and out, are easily accessible for thorough cleaning. The top screen that supports the filter paper, a center separator, and the bottom plate is all there is to it. These parts can be separated without unscrewing bolts or nuts. The tie rods of the complete plate assembly holds the plate parts firmly together without danger of bypassing.

With most other types of filter plates the inner surfaces are inaccessible and cannot be cleaned; contaminating food particles are locked in and the first run of a new batch frequently must be discarded or rerun through the filter to obtain a pure product.

With Sparkler sanitary plates, a pure product is obtained right from the start, and continues pure with fine sharp filtration to the end of the filtering cycle.

Sparkler filter plates can be removed for cleaning in one unit and a fresh thoroughly clean set lowered into the filter tank. This reduces down time to a matter of minutes.

Sparkler filters are available in stainless steel, monel, nickel, bronze, or Hastelloy, steam or brine jacketed. Available in a range of capacities up to 10,000 G.P.H.

They are efficient in filtering all food products such as:—

Candy Scrap	Liquors	Lard
Chicken Broth	Milk	Deep Frying Fats
Cider	Molasses	Beet Sugar Syrup
Egg Albumen	Syrups	Beer
Extracts	Vinegar	Wines
Flavors	Fruit Juices	Whiskies
Honey	Alcohols	
Gums	Beverages	

For personal service on your filtration problems Write . . . Mr. Eric Anderson

flavor of nut and "butter" type ice creams than that of the fruit flavors studied. It was somewhat more effective when added to the fruit or nut flavoring material directly rather than when added to the basic mix.

In general, the study indicated that this flavoring material was less compatible and had little synergistic effect with fruit flavors in ice cream. With the nut and butter type flavors studied, better results were obtained.

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Above feature is Contribution 2507 of the Maryland Agricultural Experiment Station, Department of Dairy Husbandry Miscellaneous Publication 188.

End (Resume reading on page 86)

Dual 1-Floor Operation

—Continued from page 78

natural casing) and another for meat loaves. Nearby is the casing cooler.

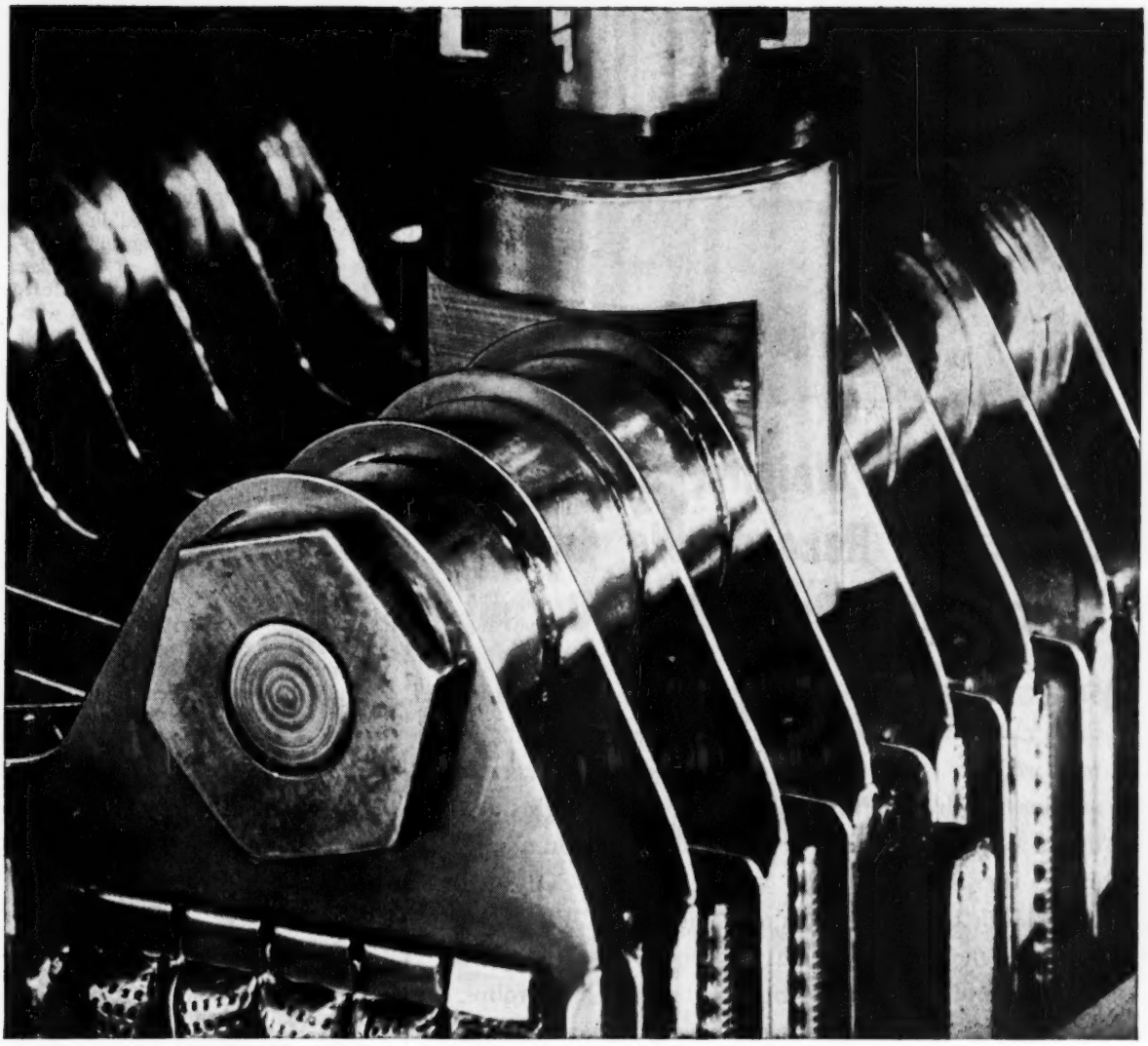
Racked stuffed sausage products are railed into their assigned bank of four smokehouses, and then go to a 20-cage sausage cooler. Meat loaves move into cooking tanks, which are equipped with automatic temperature controls and timers.

Multi-Packaging Operations

Packaging of sausage products is carried out on three lines.

Frankfurters, for instance, travel from chill-room to holding cooler for peeling and packaging. In the holding cooler are twelve side-by-side rails, each feeding eight cages of frankfurters to the packaging line. With this arrangement, those cages that are first-in are first-out for packaging.

Wieners are first stripped of cellulose casing at a rate of 200 per min. by three Linker machine peelers (FE, May, 1953). Peeled franks continue onto a 1½x60-ft. conveyor for packaging into 1- or 5-lb. units. Those put up in 1-lb. units are weighed and transferred either to a Stokes & Smith Stretchwrap machine for packaging in



The inside story on industrial truck battery costs

You are looking at the interior of one of America's most unusual batteries! It is unusual because the cells themselves are made of steel . . . not just the "steel tray" assemblies. Result: the strongest battery construction available for industrial truck use today.

Furthermore, the electrolyte used in EDISON batteries is alkaline—a natural preservative of steel. In daily use, these battery features mean that EDISONS are electrically foolproof—not harmed by such accidents as over-charging, short circuiting, etc. That's why, in hundreds of truck operations, EDISONS give *more than twice* the performance life of conventional batteries.

Such profitable EDISON features add up to one important conclusion: most dependable power at lowest over-all cost.

Personally evaluate these facts. Request a visit from the Edison Field Engineer in your area. Write Edison Storage Battery Division, Thomas A. Edison, Incorporated, West Orange, New Jersey.

Most dependable power . . . lowest over-all cost you get both with an EDISON

EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES

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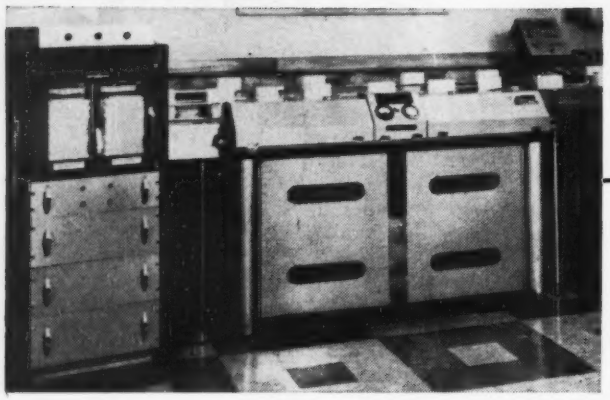
For more information, use coupon on page 159.



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Pliofilm or to the line for packaging in Cry-O-Rap bags. The 5-lb. units are banded by two Kartridg-Pak machines, and then they are hand-packed into cartons.

Packaged on the Cry-O-Vac line are butts, hams, meat loaves, Polish rings, and all-beef-frankfurters (FE, Nov, 1953). This conveyorized line comprises six vacuum-pulling and crimp-sealing stations and a shrinker equipped with hot water sprays. Meats emerge from the shrinker over a wire-mesh table to permit draining of water from the packages.

Vacuum Packaging

Sliced luncheon meats (6-oz. units) are vacuum packaged in transparent, laminated pouches by a semi-automatic Flex-Vac machine. Rate is 850 packages hourly.

Luncheon-meat loaves are sliced and stacked, two at a time, by a U.S. slicing machine. After two stacks of six slices (each slice weighing 1 oz.) are formed on a short Neoprene belt, they travel about ½ ft. Then the belt stops to receive two more stacks, and the cycle repeats.

Two girls next pack each stack into pouches. Each pouch is slipped over an open-end, horizontal, stainless steel tray clamped to a packing table. A girl then picks up a stack of sliced meat with a specially designed spatula and slides it into the tray, which guides it into the pouch.

Now pouches are loaded into a row of three slotted compartments in one of four chambers of the Flex-Vac unit. After compartments in a chamber are filled, the operator smooths open-pouch ends and steps on a foot pedal. Then top and bottom of pouches are gripped by mechanical guides as chamber rotates to complete a 10-sec. vacuumizing and heat-sealing cycle. Pouches are next packed in cartons, which are sealed and go to shipping.

Adjacent to the luncheon-meat packaging line is the 30-oz. beef and gravy canning line. Canned meats are conveyed through equipment-washing room to retorts in smoke room.

A final check on shrinkage is made as skid-loads of cased goods move over a scale in the order assembling -shipping dock area. To assure full view of operations, half of the centrally-located, glass-enclosed shipping office (10x12 ft.) is situated in the order-assembly room and the other half is on the loading dock.

Off-the-street tailboard loading of 25 trucks is carried out along the front of the building. In this way, drivers have no trouble getting early start on deliveries.

End (Resume reading on page 79)

Sealva

THE NEW HERMETICALLY SEALED FLAVORS!

Sealva flavors are protected against the ravages of oxidation and atmospheric change. Sealva processed flavors appear physically as powders, yet in reality they are minute droplets of pure flavor individually hermetically sealed.

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Alva FLAVORS

For more information, use coupon on page 159.

NEW PACKAGES & PRODUCTS

Baked in Can and Vacuum-Sealed Items Marketed

After three years of intensive research and marketing experimentation, Canned Bread Specialty Co., Inc., Philadelphia, is processing a line of eleven regular and nine dietetic canned bread and cake items.

Using the "Oven Fresh" label, the company offers white bread, whole wheat bread, rye bread, seeded rye bread, corn bread, gluten bread, pumpernickel, coffee cake, pound cake, whole wheat pound cake, and angel food cake in 6-oz. cans.

Designed for the dietetic market are canned whole wheat bread, gluten bread, rye bread, seeded rye, pumpernickel, white bread, and almond filled pecan coffee cake, are available without salt and sugar.

The products are ready to eat, though the manufacturer suggests heating to 400 degrees in consumer ovens for added flavor. The consumer is also cautioned to keep the bread or cake refrigerated after opening.

Packed in an olive-drab can, the product is labeled in red, brown, and white. The label indicates contents and brand name, as well as illustrating the manufacturer's complete line.

Future plans of the processor call for marketing of cheesecake and raisin pound cake.

Pliofilm Wrapped Brisket

Great increase in consumer sales have been reported by distributors through Pliofilm wrapping of beef tongues and corned beef briskets. Made from 120 HM Pliofilm by Milprint, Inc., Milwaukee, wrap features cooking instructions for contents. The actual wrapping, for example in the case of Von's Grocery Co., Los Angeles, is done by the retailer.

For packing briskets, the casing, sealed at one end, is fitted over the small end of a meat stuffing horn. Brisket is inserted at an angle and the horn expands with the pressure of the meat moving through it. The packager then twists the brisket so it enters the casing in a flat position. The open end of the package is gathered, twisted, and tied with a metal clip. Tongues are packed more easily since they conform more readily to the shape of the stuffing horn.

Briskets are cut to sizes desired, and whole spice may be sprinkled on top to add flavor in cooking.

For Package Data Use Reader Service, p. 159

Foil Envelope for Mix

Latest entry in the packaged mix field is 7-Minit Fluffy Frosting produced by 6 O'clock Foods, Norristown, Pa. Duplicating the popular seven minute icing made from sugar, egg white, and water, the mix is attractively and durably packaged in a heavy gauge aluminum foil envelope developed by the Reynolds Metal Co., Louisville, Ky.

The 6-oz. package is moistureproof to offset the highly hygroscopic character of the mix.

The foil prevents lumping and loss of flavoring. It is attractively color-printed and heat-sealable as well.

For Package Data Use Reader Service, p. 159

PROTECTED by Riegel

LIPTON'S CHICKEN NOODLE SOUP NOW USES RIEGEL'S POUCH-PAK . . . A LAMINANT OF POLY-COATED POUCH PAPER (OUTSIDE) AND FOIL (INSIDE). POUCH-PAK IS HIGH-GLOSS COATED PRINTED AND LAMINATED BY RIEGEL.

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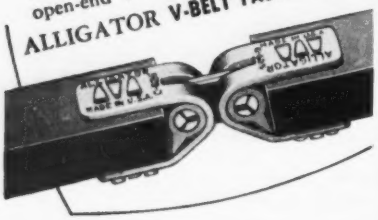

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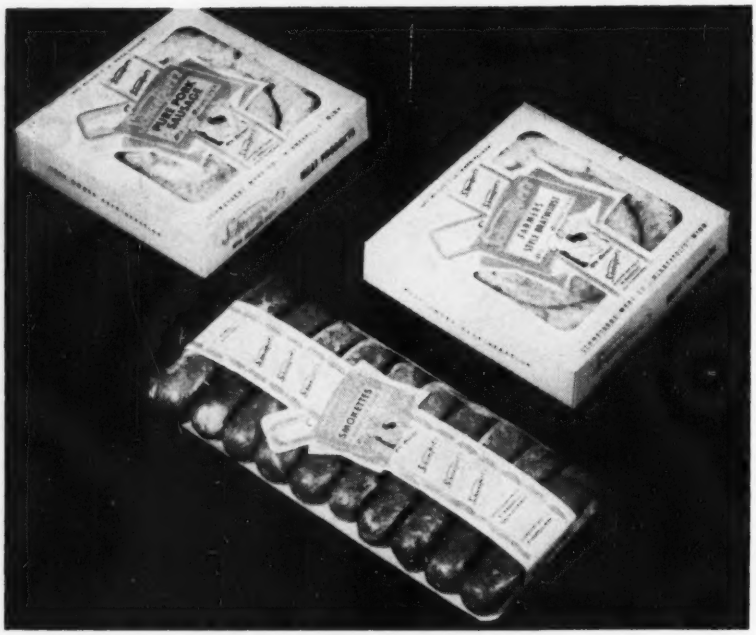
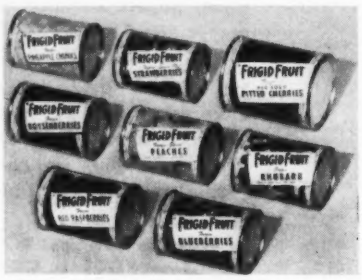


"Family Design" for Meat Packages

In line with the current trend toward "family packaging", Schweigert Meat Co., Minneapolis, Minn., has introduced three new look-alike units for processed meats. Produced for the processor by Marathon Corp., Menasha, Wis., the meats are packed in the familiar Wallet-Pak type cartons for pork sausage and bratwurst. A similarly labeled Look-Pak unit is used for Smokettes, a smoked pork sausage. All are printed in three colors, red and blue on a yellow background, giving a prominent position to the Old Meister trademark of the processor, a chef holding a platter of sausages.

All cartons have product visibility. The pork sausage and bratwurst packages hold 1 pound, while the Smokettes package holds 12 ounces.

For Package Data Use Reader Service, p. 159



Family of Frozen Fruits

Frigid Food Products, Inc., Detroit, is producing a "family" of frozen fruits packed in 10½-oz. round sanitary lithographed cans manufactured by the American Can Co.

Pineapple chunks, strawberries, boysenberries, peaches, rhubarb, red raspberries, blueberries, and red sour pitted cherries are packed in attractive cans decorated with color lithographs of the product, and a label resembling a shipping tag. The cherries are packed in a 20-oz. can.

For Package Data Use Reader Service, p. 159

Dietetic Chocolate Bars

Loeb Dietetic Food Co., New York, is marketing three new chocolate bar products especially for the consumer on a salt or sugar restricted diet. Made in vanilla dark chocolate, milk chocolate and mocha, the chocolate is sweetened with hexitols. Other ingredients are skim milk solids and cocoa butter.

Feminine Appeal Stressed

An egg-safety carton designed and produced by Robert Gair Co., Inc., New York, is directed at women shoppers through the use of distinct feminine appeal in labeling.

Produced for Champagne's Super Markets, Inc., Manchester, N. H., the carton is printed in a floral pattern with the brand name displayed in a lacy oval. Color of the carton indicates egg size—blue for large, orchid for medium, and green for small.

For Package Data Use Reader Service, p. 159

Poly and Glass Wine Bottle

Featuring the first practical combination of glass and polyethylene in the beverage packaging field, Roma Wine Co.'s new 2 "dripless" wine bottle has recently been introduced.

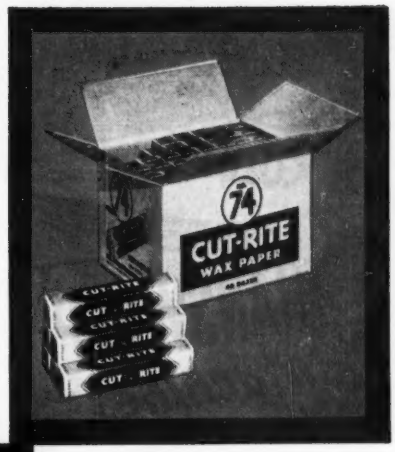
The new bottle is made of glass but features a precision collar or casing of polyethylene fitted into the neck of the bottle. The collar has a lip with a thin edge functioning on the scientific principle of surface tension. The lip cuts off the flow of wine after pouring and causes the last drops to fall back in the bottle. The new bottle was designed by Glass Containers, Inc.

Polyethylene was selected for use in the bottle because of its tasteless and odorless characteristics and because it offers a smooth surface that eliminates undue friction in resealing or removal of the bottle cap.

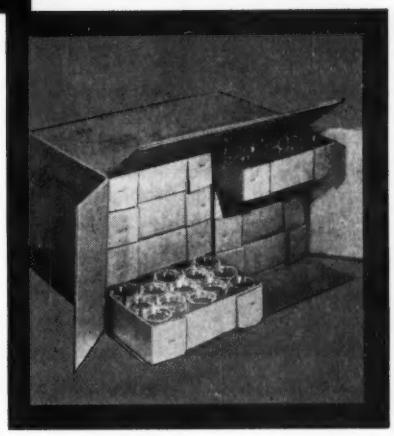
The "dripless" bottle retains the traditional Roma shape and lebeling, with the addition of a small yellow sticker for identification.

For Package Data Use Reader Service, p. 159

STURDY
CONSTRUCTION



ECONOMICAL
SHIPPING



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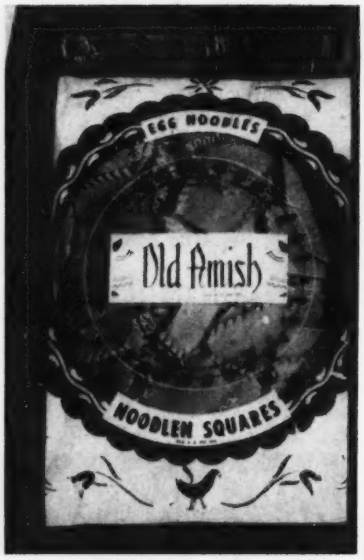


Square Noodles In Cello'

La Premiata Maracaroni Corp., Connellsville, Pa., is marketing Old Amish Noodlen Squares in a cellophane bag featuring a unique design and unusual colors.

Created by Milprint, Inc., Milwaukee, bag is decorated with art characteristic of early Pennsylvania settlers in red, and blue shades. A circular transparent window gives the consumer a view of the product—a rectangular egg noodle with fluted edges. The back of the package features authentic Amish recipes.

For Package Data Use Reader Service, p. 159

Family Size Frozen Pies

Apple, cherry, peach, mince, and boysenberry frozen fruit pies in a 1-lb, 10-oz. family size, are currently being marketed by Omar, Inc., Omaha. Serving five to six people, the pies are over-wrapped in five colors. The company reports that quick freezing of the pies in the plant retains the fresh fruit flavor and also makes the pie crust flaky.

Flexible Soup Package

Reported as the first use of a flexible package for dehydrated soup, a printed cellophane bag produced by Milprint, Inc., Milwaukee, Wis., is being used by Nut-Ola Fat Products, Inc., New York. Containing only a pound of the soup base, the product, when prepared, will serve eighty persons.

Printed in bright red, blue, yellow, and white, the package has strong visual appeal.

The product was formerly merchandized in jars, but the adoption of the cellophane bag has greatly reduced package costs, particularly lowering freight charges.

For Package Data Use Reader Service, p. 159

Ready-to-Use Cheese Sauce

Borden Cheese Co. is marketing a new ready-to-use cheese sauce in an 8-oz. re-usable drinking glass.

Designed to add flavor to hot dishes, the sauce may also be used as a spread for crackers. A pasteurized process cheese spread with a mild Cheddar cheese base, the sauce has been given a soft texture and spreading quality through the addition of non-fat dry milk and whey solids.

Divider-Pack Can

A new divider-pack can is being used by Chun King Sales, Inc., Duluth, Minn., for its line of chow mein products. Designed for flavor protection, the divider pack features two cans joined by a tape band, one containing sauce and the other the vegetables. The consumer combines the ingredients and then heats before serving.

Full "Makings" for Pizza

Complete ingredients for quick-baking Neapolitan-style Italian pizza are contained in an attractive package produced by V. La Rosa & Sons, Inc., New York. The 13-oz. package holds a bag of prepared mix for special pizza crust, an envelope of active dry yeast, and a can of La Rosa pizza sauce.

New Product Shorts

Improved Butter Wrap

Minerva Wax Paper Co. has introduced an improved opaque-white parchment butter and margarine wrap, featuring whiteness and superior greaseproofing.

Strawberry Concentrate

Frozen strawberry concentrate in 5-lb. cans is available to jelly manufacturers in a 6-1 concentration. Product is prepared by the Driscoll Co., San Martin, Calif.

Tenderizer Released

Formerly only available for chefs, 3V Papaya Meat Tenderizer is now being released for the consumer market by the Three Vee Co., New York.

New Twist In Pretzel Packaging

Old fashioned soft pretzels are being packaged in printed cellophane bags by Joseph Senatore Bakery, Newark, N. J.

Flavors for Cottage Cheese

McCarthy Fruit Products Co., Evanston, Ill., has developed two fruit flavors designed to blend with cottage cheese. Said not to "bland out" or become "masked", the flavors are pineapple and fruit cocktail.

Smaller Biscuit Pack

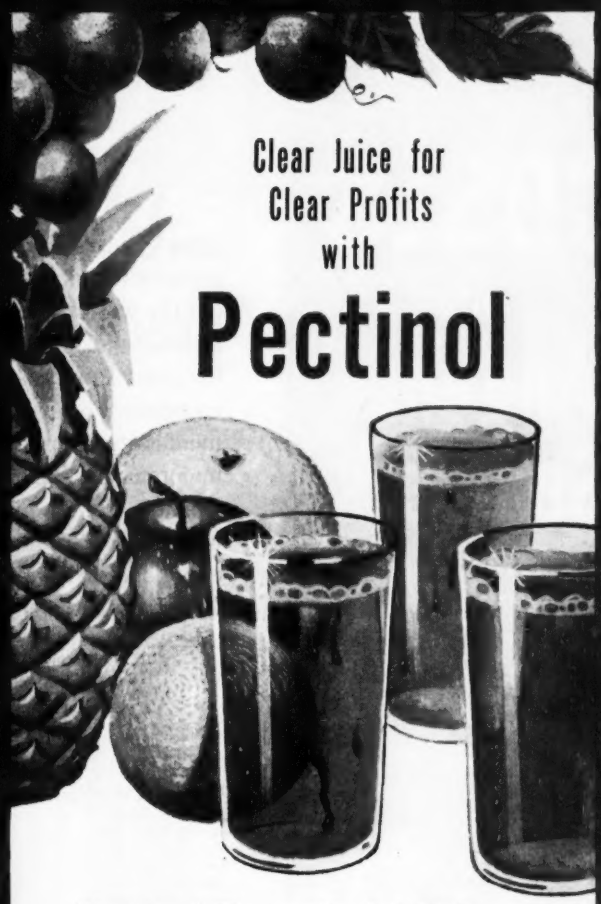
Keebler Wayl Baking Co., Philadelphia, is introducing a new 8-oz package of Saltines. Identical to the regular size, package includes a wax wrap outside and two individually wrapped packets inside

Peanuts in Cans

Franklin Foods, Hazel Park, Mich., is producing its dry-toasted peanuts in a vacuum-pack metal container made by American Can Co. The can is to be used in plastic dispensing machines.

Frozen TV Dinner

Pre-cooked and ready to heat and serve, C. A. Swanson & Sons, Omaha, Neb., frozen TV Dinner offers sliced roast turkey, stuffing, gravy, green peas and sweet potatoes in a 12-Oz. package.



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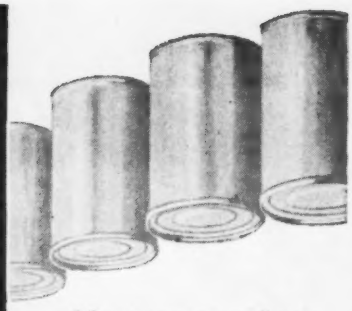
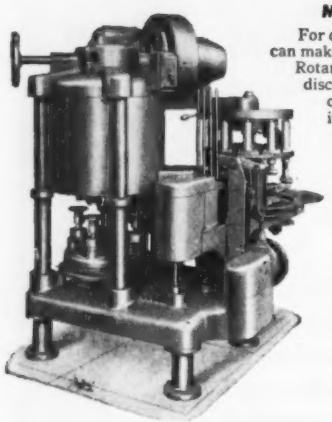


More canners and can manufacturers throughout the world are switching to Angelus Seamers for greater production economies, lower investment costs and minimum maintenance. Angelus Seamers, the products of more than 40 years of experience in developing and manufacturing, are the ultimate in simplified, rugged, efficient design.

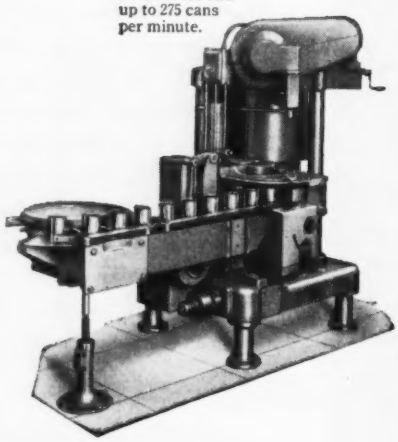
Model 40P-DF

For can closing and can making. Automatic Rotary Seamer with disc feed for round cans 2⅛" to 4¼" in diameter and up to 275 cans per minute.



Model 40P-MSLF

With chain feed for can closing only. Automatic Rotary Seamer for round cans 2⅛" to 4¼" in diameter and up to 275 cans per minute.



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Sessions With Supervisors

—*Continued from page 62*

also as compared to the total expenditure for labor, many mysteries and misunderstandings can be cleared away.

Accidents can be presented as a loss to the individual and also as a loss to the company. Stress can be put on the importance of accident prevention and the responsibility of supervisors in a safe-guarding capacity.

4. "Bone structure" of the company can be clarified through use of an organization chart graphically showing interdependence of operations, the seats of responsibilities, and the need for cooperation all along the line.

5. Not to be omitted is the matter of "letting supers in" on overall company policies and future planning—both immediate and long range. A "keep them advised" policy should be incorporated in follow-up and follow-through programs. However, plans for shifting departments, rearranging of plant, changes in scheduling, in equipment, and the like, should be discussed in advance with the supervisory group. Their suggestions are often invaluable.

Do's and Don'ts

To the extent possible, it is advisable to gear all programs to the intelligence level of the group. This may not be easy, since intelligence level may vary greatly. A recent study of approximately 4,000 foremen and supervisors in many industries revealed that a third had no schooling beyond the 8th grade, while another 30% did not finish high school. Only 10% of the group had some college education, while 7% were college graduates.

Obviously, "level" of the program should be maintained generally low enough to hold the interest of those at the bottom. Use simple words and illustrate whenever possible. Though this approach may be a bit below those further up the educational scale, the program can be geared to them, too. This may be accomplished by directing questions to this group and calling for their suggestions. Participation in discussions is vital to the success of any program.

When possible keep the size of groups small enough to stimulate discussions. In large operations this may require dividing supervisory personnel into several groups. F. & M. Schaefer Brewing Co., Brooklyn, prefers conference-type meetings running 15 to 20 persons. Here, sessions are once a

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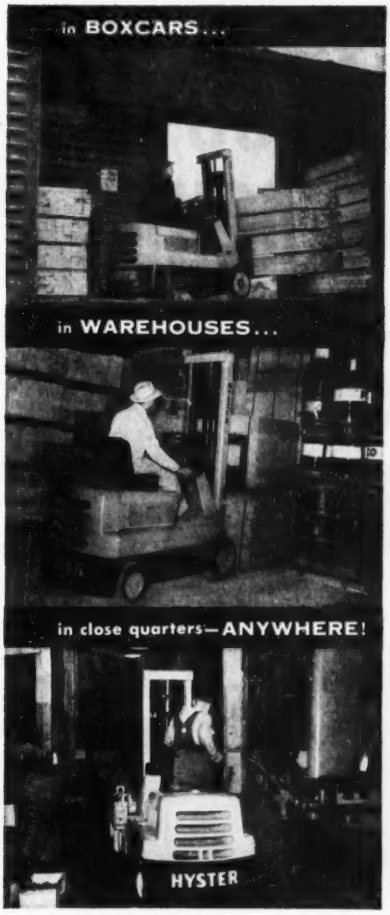

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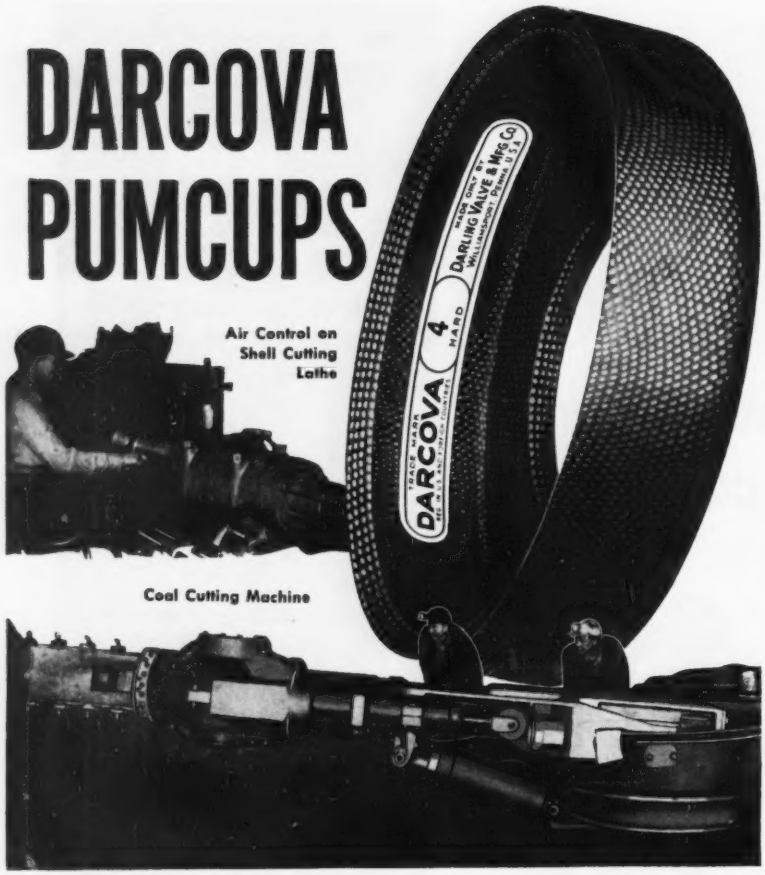
DARCOVA PUMCUPS



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There are two basic reasons why Darcova Pumcups have proved to be more efficient: (1) Texture engineered Pumcups outlast most other piston packing at least 3 to 1. (2) Pumcups operate at full efficiency *throughout* their entire life span.

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PUMCUPS

week for a period of 12 consecutive meetings. This company has found that best attendance can be expected, and most sustained interest held, when attendance is voluntary.

Length of your meetings will depend on circumstances. Usual allotment is 3 hr. At Schaefer's the first 1½ hr. is on company time, followed by a company provided evening meal, then another 1½ hr. of meeting on employee time. In many organizations supervisors are compensated for all the time they devote to the meetings.

So far as possible, lay out programs to stimulate questions. Strive for participation of everyone—for final results will depend largely on the degree that all contribute. Draw the reticent and "hold-backs" into discussion by directing questions to them. Endeavor to get them to talk—and they will enjoy it. It is well to remember that when conclusions come as the result of discussions they become the viewpoints of the group—not something crammed down their throats by management.

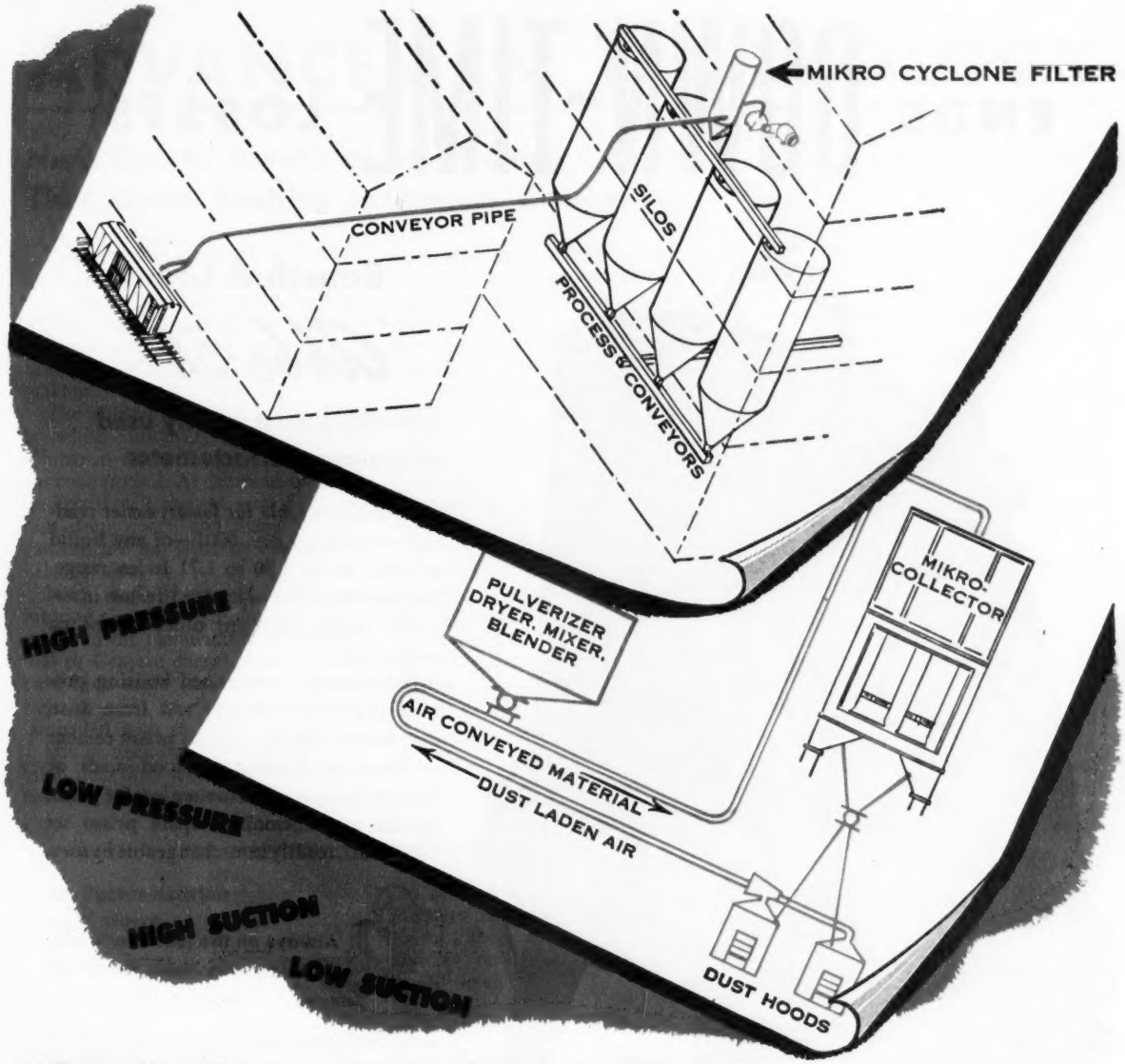
Plan well in advance, announcing subjects to be discussed in ample time before meetings. At least some of the supervisors will give thought to the subject, assuring thereby an intelligent flow of questions and contributions. Often it's helpful to assign topics to individuals in advance.

The more "all inclusive" the program and meeting, the greater the benefits. Seabrook's Farms Co. and P. J. Ritter Co., both at Bridgeton, N. J., include in meetings all those who have any supervisory contact with employees. At Ritter's twice-a-month gatherings, the executive group is always represented, the president attending when possible. Engineering, quality control, I.B.M. control group (payroll, accounting, etc.), maintenance, production, development and research, personnel and occasionally sales departments are represented at the sessions. Meetings are scheduled. They start exactly on time, last 1 hr., and end on time.

It is well to make progress-in-individual-attainment the basis of advancement. This does not require that supervisors be made managers, but only that their responsibility be extended as justified by individual accomplishment, with income advancement in proportion.

The first series of meetings sets the stage for a continuing program and will be of value in proportion to the follow-up and the follow-through. If the first series is well planned, subject material for subsequent meetings will be no problem, neither will attendance nor interest of the men.

End (*Resume reading on page 63*)



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ADVANCES IN TECHNOLOGY

Nisin Checks Growth of Gas-Forming Clostridia That Cause Swelling In Process Cheeses

That certain strains of lacto-bacilli occurring in milk produce an antibiotic (nisin) was first suspected when milks from some localities in New Zealand failed to support growth of acid-forming bacteria used in cheesemaking.

The antibiotic is now to be had as a white micro-crystalline powder, soluble in dilute acids or in acidified aqueous alcohol. At dilutions of 1:100 million it will prevent growth of certain streptococci, and many microorganisms are inhibited by dilutions of 1:1,000,000.

Nisin easily holds in check gas-forming clostridia that are highly dangerous in the manufacture of Emmenthal or Gruyere cheese. Such cheeses have been made successfully by addition of nisin to milks heavily contaminated with clostridia.

Use of nisin-forming bacteria to inhibit undesired lactic acid producing bacteria is not without danger to cheesemaking in the event of a virus infection carrying off the starting organisms completely. In processed cheesemaking, however, while flavor production and acid development are completed, gas-forming clostridia are still troublesome—92% of Cheddar cheese samples have been found infected. They cause swelling and "blowing" in packaged process cheese.

Addition of 50 units nisin (a gram of crystalline nisin contains about 40 million units) per gram of cheese gives some protection against blowing, and 100 units gives good results. Use of nisin, or cultures of nisin-producing streptoccoci in milk for process cheese making may therefore reduce the gassy fermentations troublesome to this industry. Such cultures are already in successful use in France.

Digest from "The Antibiotic Nisin and its Use in the Making and Processing of Cheese," by N. J. Berridge (Nat. Inst. for Res. in Dairying, U. of Reading, England) *Chemistry & Industry*, 1158-61, Oct. 31, 1953.

Milk Pasteurization Temperatures

Holding times in HTST pasteurizers can be reduced as much as 50% if air pockets exist in a downward-sloping holding tube. Therefore, the minimum upward slope that will eliminate air pockets should be insisted on.

Holding time is not the whole story in determining effectiveness, however, and total pasteurizing effect is always significantly greater than the holding time indicates. Minimum time of exposure of a milk particle to heat treatment is important from a public health standpoint, but neither the salt test—a sound measure of time for continuous pasteurizers—nor the average time, is entirely adequate for determining the time-temperature combination necessary for phosphatase inactivation.

Commercial pasteurization at 160 F. for 15 sec. will go considerably beyond the phosphatase inactivation point. To comply with a legal 160 F. standard it is not uncommon to set control valves and heating units so that the actual pasteurization occurs at 161 or even 162 F.

Inasmuch as cream volumes begin to decrease seriously above 158 F., and all evidence indicates completely adequate pasteurization by 160 F. for 15 sec., there is no good reason for insisting on higher temperatures or longer times.

Digest from "Some Mechanical Features of a Plate-Type HTST Pasteurizer," by S. A. Hansen, F. W. Wood, and H. R. Thornton, *Canadian Journal of Technology*, 231-39, Oct.-Dec. 1953; "Phosphatase Inactivation in HTST Pasteurization of Milk," *Ibid.* 240-49; "Creaming Impairment in HTST Pasteurization of Milk," *Ibid.* 250-55.

Keeping Quality of Milk

Milk plants with past records of good bacterial counts are likely to produce milk of better keeping quality than plants with poor past records.

Pasteurization as usually carried out will almost, if not completely, destroy psychrophiles; but bactericidal treatment of all post-pasteurization equipment, including bottles, is essential to prevent further contamination with these bacteria.

The psychrophile problem is essentially a plant problem, and specifically a post-pasteurization problem. Routine standard plate counts and coliform counts of freshly pasteurized milk are not good indicators of keeping quality. A psychrophile count is not a good indicator unless an unusually large quantity of milk is examined. The mere absence of psychrophiles in 1 or 2 ml. of milk is not a guarantee of long storage life. Addition of aureomycin to samples was without substantial effect in lowering bacterial count, nor did it prevent marked deterioration of flavor after 4 days of storage.

Digest from "The Keeping Quality of Pasteurized Milk as Influenced by the Growth of Psychrophilic Bacteria and the Addition of Aureomycin," by J. C. Olson, Jr., D. S. Willoughby, E. L. Thomas, and H. A. Morris, *Journal of Milk and Food Technology*, 213-19, Sept.-Oct. 1953.

FRUITS & VEGETABLES

Papaya Quality

From May through Nov., when sugar and ascorbic acid content of Hawaiian papayas are highest, quality of the fruit appears to be best.

This was indicated by an 11-month (Feb.-Dec., 1950) study of 311 samples of Solo papaya. Fruit were analyzed chemically for ascorbic acid, total sugar, moisture and pH, and scored organoleptically for color, tex-

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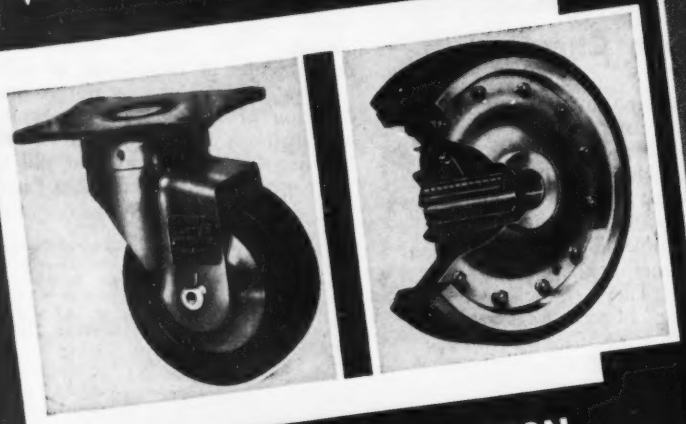

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ture, flavor, degree of sweetness, and general opinion of taste panel members.

Ascorbic acid, total sugars, and organoleptic scores showed significant monthly changes in the fruit. Direction of fruit on trees was highly significant for total sugars, but was not significant for ascorbic acid and subjective factors.

Highly significant correlation coefficients were noted between total sugar and flavor scores, total sugars and sweetness scores, total sugars and ascorbic acid, moisture and ascorbic acid, pH and total sugar. Significant coefficients were obtained between pH and ascorbic acid.

Digest from, "The Sugar and Ascorbic Acid Content of Papayas in Relation to Fruit Quality," by K. J. Orr, H. Denning and C. D. Miller, *Food Research*, 532-37, Sept.-Oct. 1953.

Dietetic Preserves

Jams and jellies that normally range in sugar concentration from 65-70% can be dietetically sweetened by a combination of sodium or calcium cyclamate and saccharin.

Other essential features of the patented process are use of a low methoxyl pectin to form a gel, adjustment of pH to between 3 and 4 with citric or other edible acid, and addition of calcium ion to bring its concentration to at least 25 mg. for each gram pectin used.

Quantity of cyclamates and saccharin that may be used is limited by the bitter taste imparted if too much is added; but the cyclamates are always used in greater quantity than saccharin. A satisfactory formula, in percentage of ingredients, is: Fruit derivatives, minimum, 98.238; saccharin, maximum, 0.032; cyclamate, maximum, 0.23; low methoxyl pectin, maximum, 1.5. Formula may be varied depending on the fruit used and the sweetness desired.

Digest from U. S. Patent 2,653,105, issued Sept. 22, 1953, on an application dated Dec. 8, 1952, to James B. Gordon, Burlingame, Calif.

Cucumber Fermentation Studies

Fermentations of cucumbers from the same plot of ground, and under both commercial conditions, at Mason, Mich., and in the laboratory, were found to be produced by two groups of microorganisms—acid-forming bacteria, and yeasts.

Lactobacillus plantarum was the predominant form of acid bacteria, but a gram-positive coccus was also isolated. *Torulopsis holmii* was the predominant yeast in 7 of the 10 studies, and is responsible for the early vigorous fermentation in the northern cucumber packing areas. *Torulopsis*

for lower cost control of moderately **Corrosive** fluids

Fig. 2651-A Gate

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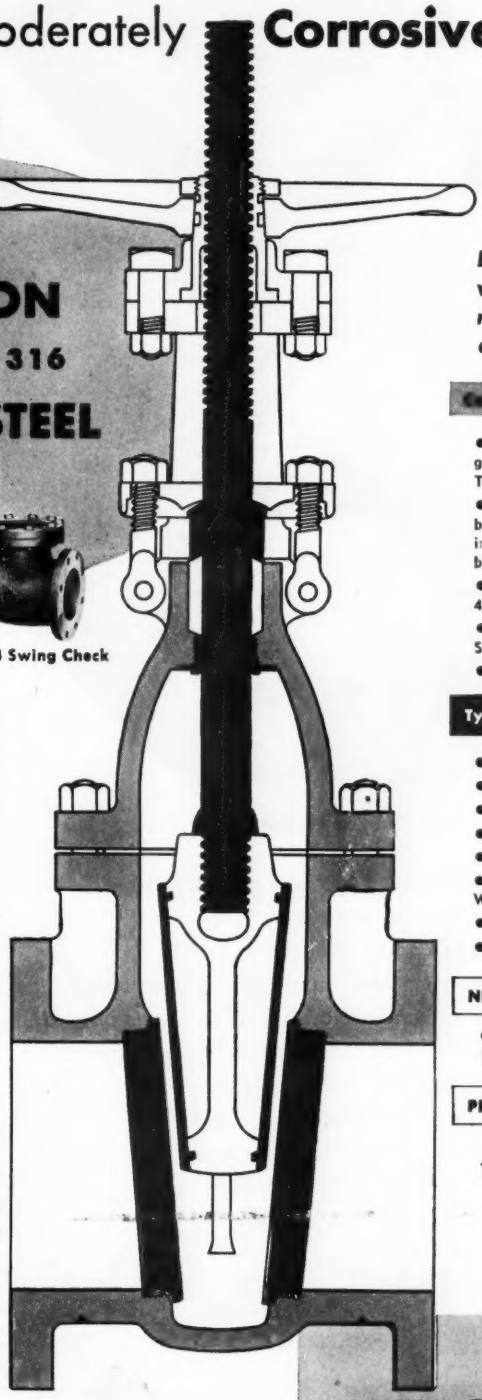
Valves with Type 316

STAINLESS STEEL

Trim

Fig. 2624 Swing Check



This combination provides corrosion resistance well above the moderate need in many processing services with an investment well below that for all-stainless steel valves.

Designed primarily for the chemical process industries, they are recommended for control of mildly corrosive liquids with minimum quantities of mineral acids, such as creosote in wood treatment, and many liquids carried in petroleum processing.

A major use is in pulp and paper processing, particularly in lines serving the digester, and in the chemical recovery cycle. Service records in lines carrying the valve-punishing "black liquor" give Jenkins Nickel Iron Valves top performance rating.

Jenkins *extra value* construction throughout. Get details — compare. See why they stretch your valve investment dollar — with longer service life, lower maintenance cost.

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- **BODIES** Heavy duty, dimensioned for greater resistance to wear and abuse. Through port design in Gate Valves.
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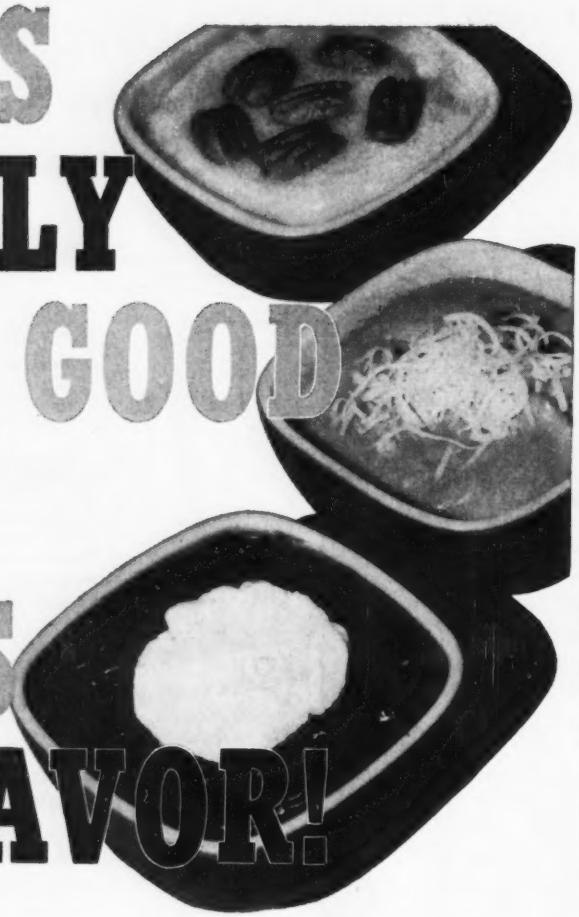

BOON that it is to busy housewives, the now popular instant puddings had to offer something more than mere easy-to-make convenience to win the continuing demand of a discriminating, hard-to-please home audience. The "something more" these products offered was GOOD FLAVOR,—vanilla, chocolate, custard, coconut, strawberry, raspberry, caramel, butterscotch— flavors that appealed and satisfied. While novelty of product gave instant puddings their initial impetus, tasty flavors kept them at their lively selling peak. Which is what good flavors can do for any food or beverage product . . . .

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rosei predominated in one fermentation and in the laboratory fermentations. Following these, *Brettanamyces versatilis* becomes active. *Hansenula subpelliculosa* was also isolated from the latter part of the fermentations.

Biotin, niacin, and pantothenic acid are rapidly made available in cucumber fermentations, reaching a maximum in 5-10 days. Amino acids sufficient to support growth of *L. plantarum* are present in 24 hr. Small cucumbers have more of these nutrients and diffuse them into the brines more rapidly than large ones.

Niacin levels were not altered appreciably by any of the 6 fermentation organisms tested. Biotin was reduced by both bacteria and yeasts, but *L. plantarum* was the only one to reduce the pantothenic acid content. Both yeasts and *L. plantarum* used up amino acids to varying degrees. Pantothenic and glutamic acids were synthesized to some extent by the yeasts.

Digest from "Microbiological Studies of Cucumber Fermentations," by R. N. Costlow and F. W. Fabian, *Journal of Applied Microbiology*, 314-19; "Availability of Essential Vitamins and Amino Acids for *Lactobacillus plantarum* in Cucumber Fermentations." *Ibid.* 320-26; "Effect of Various Microorganisms on the Vitamin and Amino Acid Content of Cucumber Brines," *Ibid.* 327-29, Nov. 1953.

MEATS & POULTRY

Checking Liquid Egg Quality

Samples of liquid egg taken at the churn are at least as satisfactory as samples drilled from the frozen products when used to determine total solids, fat and color, and whipping properties.

They give more accurate measurements of bacteriological and sanitary conditions of the product than drilled samples, and enable test results to be obtained 72 hr. earlier than was formerly possible.

These are among findings of a study of new test methods carried out by Production & Marketing Administration, USDA.

Also revealed was the fact that direct microscopic counts of bacteria in liquid egg are more reliable, rapid, and economical than the standard plate-culture method.

Digest from "An Analysis of Quality in Commercial Egg Products," Production & Marketing Adm., USDA, Washington 25, D. C.

Skinless Sausage Machine

According to a recent patented invention, skinless sausage links are continuously formed and slightly cooked by mechanical means.

Device consists of a rotating wheel on the outer periphery of which are a

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225G Plastic aprons
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226C Fat filter
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226E Wort Cat. S-A696-Rev.
226F Instrument Bul. 32
226G Wall chart
226H Communications
226I Photocopy Bk. P344
226J Sanitation
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226M Foil packaging
226N Bk. U614b-11M
226O Clad metals
226P Egg story
227 Roller-chain conyr.
228 Cold-storage doors
229a Chemical pumps
229b Mixer
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238 Heat-exch. Cat. 12
239 Boxes
240 Hollow-screw processor

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February 1954

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

New B. F. Goodrich belt grips better, lasts at least 16% longer

Self-cleaning belt offers many savings, yet costs no more

HERE'S a radically new conveyor belt, called Ribflex, that can carry packages, bags, crates, all sorts of things at angles never possible before and so make important savings in space, equipment, and time.

It's the new flexing rib design that gives this belt its nonslip, gripping action. Parallel ribs of rubber are cross cut into thousands of flexible grip blocks—more than 5,700 to the square foot. The tiny, self-cleaning rubber blocks are tough enough to grip anything carried by the belt, and move it safely, surely.

Because of this new design, the Ribflex belt keeps its effective gripping power long after belts with rough, knobby covers become worn and smooth. Tests prove the Ribflex belt will give *at least* 16% longer service life than ordinary rough surface conveyor belts.

With this improved B. F. Goodrich belt, it's now possible to design installations for higher incline angles and so make substantial savings in conveyor lengths and floor space. For example, just by increasing the incline angle from 30° to 45°, a 29% shorter conveyor can be used, 42% less floor space is needed.

The B. F. Goodrich Ribflex belt is now at work in sugar companies, processing plants, breweries, warehouses and other places where it is making many food handling jobs cheaper, more efficient. Before you buy another replacement belt or design a new installation, let a BFG distributor show you how this unusual belt can cut costs in your plant. Or for further information, write *The B. F. Goodrich Company, Dept. M-177, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

For more information, use coupon on page 159.

NEW BOOK TELLS HOW TO

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● Towers, columns, stills, evaporators can be operated at greater efficiency and capacity by following the practices recommended in this booklet. You'll find data on how to prevent valuable solids from leaving process vessels. This booklet also tells how to avoid contamination of distillate and other products with foreign entrainment; and also how to stop contamination of processes with guck and solids.

● Pipeline entrainment such as dirt, moisture, and guck in steam, vapor, gas and air lines lower the efficiency of your plant process and equipment. Keep this dangerous material out of your piping systems effectively and inexpensively by following the suggestions outlined in this brochure. This booklet also describes Hi-eF Purifiers, noted for their savings and maintenance-free operation in removing or recovering impurities.

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plurality of pockets or molds into which the comminuted meat is forced under pressure. As the wheel rotates, the meat is formed into sausage links by the pockets and associated housing. In the course of rotation, molds are electrically heated to 100-140 F. which is sufficient to melt a very thin layer of fat on the link, and facilitate discharge from the mold by an injector mechanism.

Digest from U. S. Patent 2,651,808, issued Sept. 15, 1953, on an application dated Sept. 26, 1949, to A. H. Burnett, Chicago, and J. J. Prohaska, La Grange, Ill., assigned to Swift & Co., Chicago.

FATS & OILS

Color in Treated Lard

A study of factors involved in development of the bluish coloration sometimes seen in antioxidant-treated lards, revealed that lecithin and iron contribute to production of this color, and that irradiation of lecithin-containing lard produced a blue color on the surface whereas propyl gallate had little effect.

Three commercial formulations containing BHA, propyl gallate and citric acid were tested for (a) their color-forming tendencies with iron, (b) their relative solubilities, and (c) their tendency to form colored sludges in the presence of iron and water. Color effects from iron contamination were observed with all three antioxidants; slightly immediately after mixing, but noticeably after heating the lard for one hour at 375 F.

Solubility of antioxidant mixtures proved unimportant in formation of blue color. Attempts to develop colored sludges yielded variable effects associated with the aqueous phase. Tests made to discover the ingredients contributing to the photoactivated blue color showed that no one ingredient or combination of antioxidant ingredients was responsible for the color. It was shown, however, that lecithin and iron are essential to production of the blue color in a lard system containing BHA propyl gallate, and citric acid.

Digest from "Photoactivation and Color Formation in Antioxidant Treated Lard," by L. R. Dugan, Jr. and Lotte Marx, *The Journal of the American Oil Chemists' Society*, 452-54, Nov. 1953.

SANITATION

Disposal of Winery Wastes

Cream of tartar deposits in wineries are collected and used for tartrate and tartaric acid manufacture, but it is no longer economical to use pomace or other wastes for this purpose.

How many man-hours can the MORTON BRINEMAKER save in your plant?

Just figure the costly man-hours spent hauling salt to all the areas in your plant where it is needed.

Those are the man-hours the Morton Brinemaker can save you, if your canning operation is adaptable to brine salting. And we believe you will find them considerable!

Brine at the turn of a tap

The Morton Brinemaker delivers clear, fully saturated brine that can be pumped from a convenient ground floor location anywhere in your plant. Brine is always available where and when you want it, in the most convenient way possible!

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In many types of canning, the Morton Brinemaker can save real money as well as provide the most convenient salting operation of all. How about *your* operation? Mail the coupon below *today* for full information!

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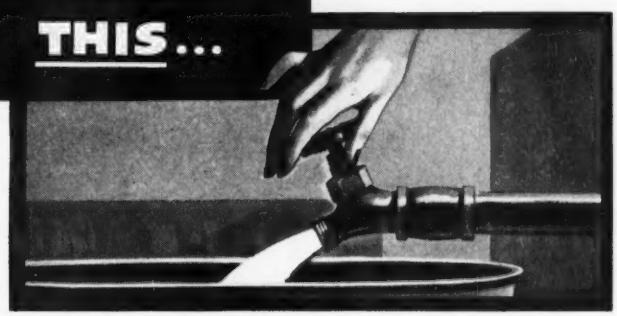

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CE-779

Century C MOTORS

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Pomace is sometimes used for soil mulches or for cattle feed after drying. Lees from dessert or table wines may be distilled for brandy recovery, but the process increases the already enormous quantity of brandy distillery wastes.

Brandy stillage amounts to about 200 gal. per ton of grapes crushed (1952 crush, 1,202,000 tons). It is very acid, high in carbohydrate type organic matter, and has a B.O.D. averaging 20,000 ppm., about that of other types of ethyl alcohol distillery wastes. It is unfortunate that tartrate recovery is not an economic process since detartration reduces the B.O.D. 50-75%.

Disposal of the wastes by ponding is accompanied by the usual problems of noisome decomposition and breeding of mosquitoes. Irrigation is one of the best ways of land disposal, using 100,000 gal. waste per acre with not over 4 in. of depth in an irrigation check, and reflooding after a drying period of 6 days.

No chemical treatment of wastes in ponds has been found effective. Liming to pH 7.0 followed by anaerobic digestion at 95 F. for 24 hr. can reduce the B.O.D. of lees stillage by 70-75%, but the high putrescibility and seasonal, intermittent production of the raw slops, makes their economic disposal a most difficult problem.

Digest from "Disposal of California Winery Wastes," by R. H. Vaugh and G. L. Marsh, *Industrial & Engineering Chemistry*, 2686-88, Dec. 1953.

Water Sterilizing Unit

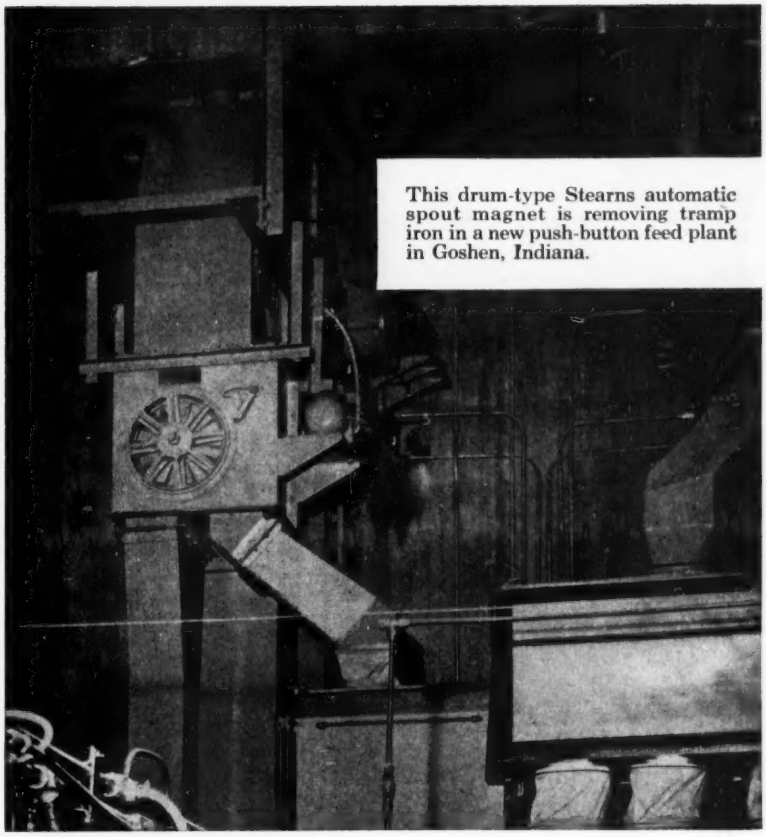
Ultra-violet as a sterilizing agent is limited by its low penetration into colored or turbid liquids. Therefore, its application is confined to treatment of water or surfaces.

The "Stevar" apparatus for the disinfection of water consists of a 2½-in. metal cylinder 15½-in. long, into which a quartz u.-v. generator is fitted with an annular space between generator and walls.

A non-corrosive metal spiral channel, through which water flows in a 0.2 in. layer, surrounds the generator. Flow is turbulent so the water is thoroughly exposed to radiation during the ½ sec. required to pass through the 6-ft. of travel.

Rate of flow is 180-265 gal per hr.; current consumption is 350w.; life of lamp generating the u.-v. is 5,000-8,000 hr. When applied to water containing up to 20,000 yeasts per ml. reductions of 99.99 percent or more resulted. Similar results were obtained with acetic acid and *Streptococcus* strains of bacteria at counts up to 178,000 per ml.

A single unit of this apparatus has



This drum-type Stearns automatic spout magnet is removing tramp iron in a new push-button feed plant in Goshen, Indiana.

here's *non-stop* protection from tramp iron

Install a Stearns drum-type magnetic spout separator and forget about tramp iron hazards. This efficient Stearns unit removes destructive bolts, nails, tacks, etc. from your product — *continuously, automatically!*

here's how it protects your product

Material in process can be fed into the separator at any angle, over a stainless steel cylinder surrounding a stationary electro or permanent magnet. As this material passes through the magnetic field, the contaminating tramp iron is held to the face of the cylinder and carried to a point beyond the magnet's pulling force and dropped into a discharge chute! The purified product falls by natural trajectory into a separate chute and continues through its production process.

No levers — no cleaning — no time-wasting interruptions. Deep, powerful magnetic field of a Stearns separator insures positive protection — even with large amounts of fast-flowing material.

1062

A post card request for Stearns Bulletin 93-E is a positive step to plant safety and product purification. Write Today.

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STEARNS MAGNETIC, INC. 667 SOUTH 28TH STREET, MILWAUKEE 46, WISCONSIN

For more information, use coupon on page 159.

The New CRCO-Fox LABELER FEEDER

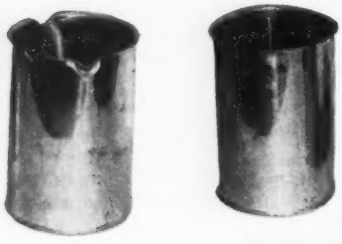
The CRCO-Fox Labeler Feeder is an inexpensive semi-automatic machine to feed cans and cylindrical glass containers from cases packed in single tiers.

In operation, the operator inverts a case on the unloading table. The case is removed and the containers are brought into a horizontal position on a track, and then fed to the labeler by gravity.

The CRCO-Fox Can Straightener

A low-cost machine to straighten the damaged flanges of empty cans. The cans with jammed and bent flanges that ordinarily would go on the scrap heap or be crudely straightened manually can be salvaged with very little labor.

Ask your CRCO Representative or write for special Bulletins.



BEFORE AFTER

THE BEST OF Everything

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FOR THE FOOD PROCESSOR

limited capacity, but several in parallel with a receiving tank for water flowing through them could supply a brewery or soft drink plant with sterile water for washing yeast, rinsing tanks or bottles, and for production of syrups. Cost of equipment and installation is small compared to other types for the same purpose.

Digest from "The Use of Ultra-Violet Radiation for Water Disinfection in the Brewery. Test of the STEVAR Disinfection Apparatus," by Aron Stöckli (Versuchsstation Schweizerischen Brauereien, Zürich), *Schweizer Brauerei-Rundschau*, Vol. 64, No. 9, 205-70, Oct. 1953.

CONFECTIONERY

Acetic Acid Vs. Cocoa Aroma

While typical cocoa aroma is due to minute amounts of essential oils, volatile acids naturally present, or liberated during roasting, also have a part in determining quality.

These acids can be estimated by steam distilling 100 g. of cocoa until a liter of distillate is collected. Distillation number is the volume of 0.1 N $Ba(OH)_2$ required to neutralize a liter of distillate to the phenolphthalein endpoint, and is of the order of 35-65, depending on the origin of the beans and the roasting and subsequent storage operations.

In many cases, however, distillation numbers may be quite similar though flavor differences are evident. Determination of fatty acids in distillates indicates that chiefly acetic acid is present with traces of propionic and butyric acids. Acetic acid content of unroasted beans is about 0.05% and decreases during roasting and warm storage to about 0.03%.

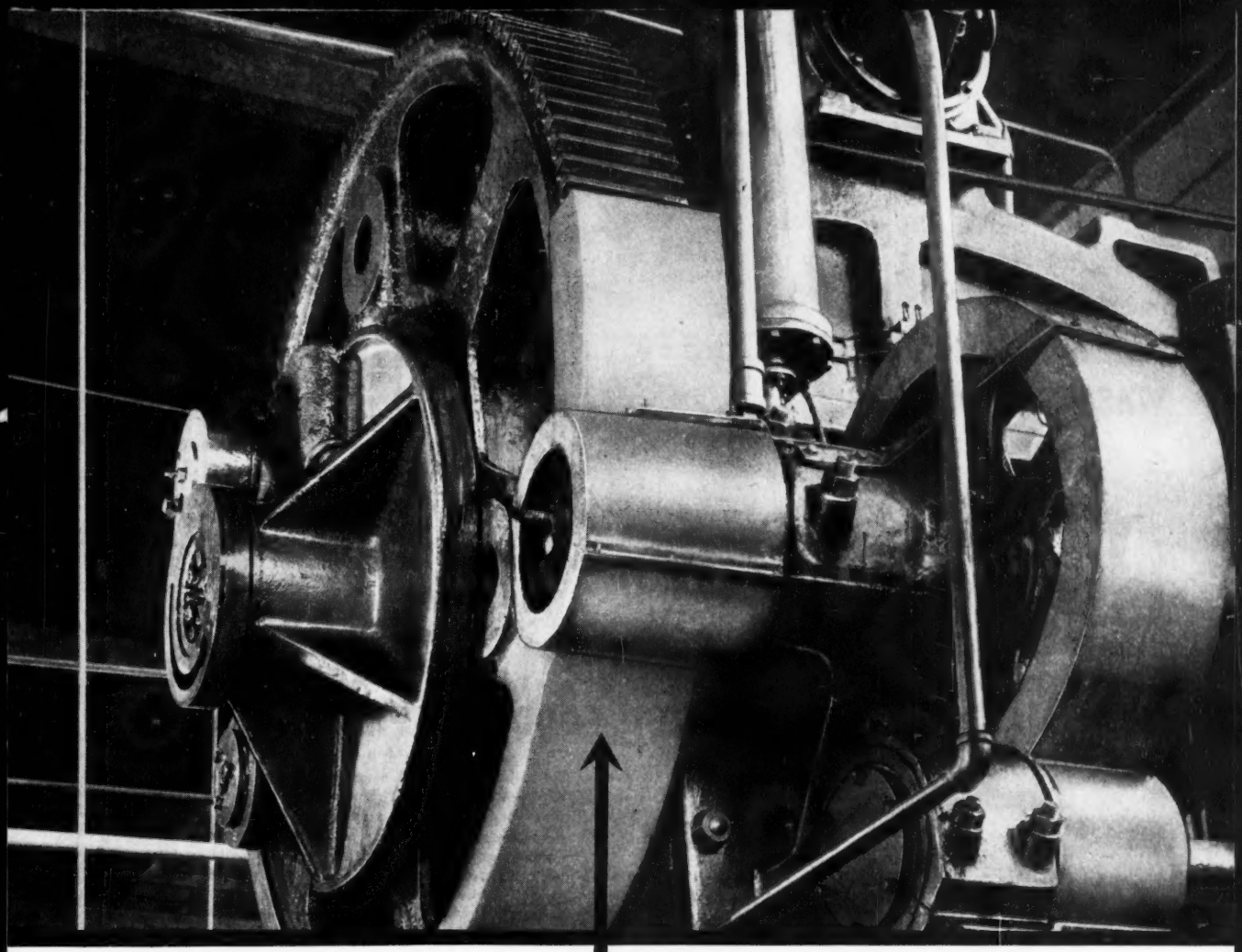
Conching does not decrease acetic acid in cocoa matter, but it becomes less in absolute amount because of the dilution with sugar. While relation between acetic acid content and taste is not completely known, the parallel between improvement due to strong roasting and reduction in acetic acid content is suggestive.

Digest from "Distillation Number and Cocoa Aroma," by J. Kleinert (Lindt and Sprüngli AG., Kilchberg, Switzerland) *International Chocolate Review*, 297-99, Nov. 1953 (in German).

CEREAL PRODUCTS

Vitamin-B Content of Cereals Not Reduced by Fumigation

In cereals that have been fumigated with methyl bromide most of the residual bromide is present in inorganic form associated with the protein fraction, indicating that the methyl group has reacted with S- and N-containing constituents.



Excessive throw-off stopped with...

Calumet Viscous Lubricants

• The lubrication of exposed gears on a 250 ton press caused trouble for a midwest metal-working company. Lubricant throw-off was excessive, creating unfavorable working conditions; frequent applications of grease interfered with production and raised lubricant consumption. The gear shield in use required pre-heating.

A Standard Oil Lubrication Engineer surveyed the situation three years ago and suggested the use of Calumet Viscous Lubricant 10X, because it is a grease of superior adhesive quality and does not require pre-heating.

Since that time the plant has used Calumet Viscous Lubricant 10X with outstanding results. Run-off to the floors and other parts has been eliminated. Gears are lubricated with maximum efficiency. Most important, lubricant consumption has been cut by more than 20%.

Where open gears as well as some enclosed types are difficult to lubricate, try Calumet Viscous Lubricants. Their superior adhesive quality and greater wetting ability give them high resistance to the washing-action of water and to thinning and throw-off at high temperatures. Several grades of Calumet Viscous Lubricants can be applied by spraying.

Standard Oil Lubrication Engineers are stationed throughout the Midwest. One of these specially trained men is in your area, on the spot when you need him most. To secure his services call your local Standard Oil office. Or write: Standard Oil Company (Indiana), 910 S. Michigan Avenue, Chicago 80, Illinois.

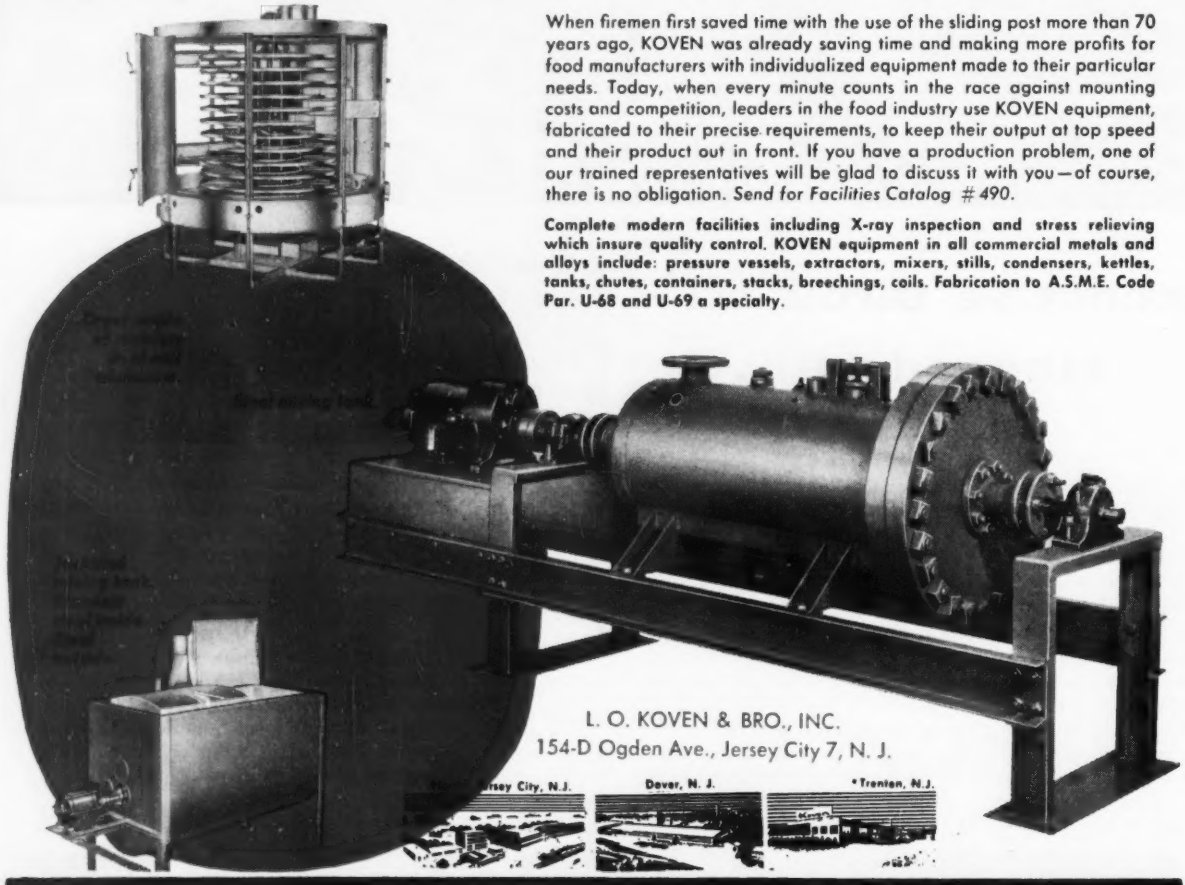
STANDARD OIL COMPANY STANDARD *(Indiana)*

BACK IN THE 1880's

WHEN THE FIREMAN'S SLIDING POST WAS FIRST ADOPTED

Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT



When firemen first saved time with the use of the sliding post more than 70 years ago, KOVEN was already saving time and making more profits for food manufacturers with individualized equipment made to their particular needs. Today, when every minute counts in the race against mounting costs and competition, leaders in the food industry use KOVEN equipment, fabricated to their precise requirements, to keep their output at top speed and their product out in front. If you have a production problem, one of our trained representatives will be glad to discuss it with you—of course, there is no obligation. *Send for Facilities Catalog # 490.*

Complete modern facilities including X-ray inspection and stress relieving which insure quality control. KOVEN equipment in all commercial metals and alloys include: pressure vessels, extractors, mixers, stills, condensers, kettles, tanks, chutes, containers, stacks, breechings, coils. Fabrication to A.S.M.E. Code Par. U-68 and U-69 a specialty.

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KOVEN FOR INDIVIDUALIZED EQUIPMENT SINCE 1881

If similar reactions occur with some members of the vitamin-B group whose structures make it possible, a loss of vitamin activity could follow. Thiamine, niacin, and nicotinamide solutions, however, showed no measurable losses.

Fumigation of whole wheat, barley, rice, corn, peanuts, peas, and beans with 300 mg. CH_3Cl per l. for 5-hr. at 77 F. caused no appreciable losses of nicotinic acid, thiamine, or riboflavin, though there was some evidence that nicotinic acid and nicotinamide react with methyl bromide. Even at much higher levels (1500-2700 mg. per l. hr.) there was no positive evidence of loss. Moisture contents from 7.1% (peanuts) to 13.4% (peas) do not promote reactivity.

Digest from "The Vitamin-B Content of Foodstuffs Fumigated With Methyl Bromide," by K. M. Clegg and S. E. Lewis, *Journal of the Science of Food & Agriculture*, 548-52, Nov. 1953.

Quick-Cooking Cereals

Improvement in the art of pre-cooking cereals in the factory to provide a quick-cooking product for the home is revealed in recent patent specifications.

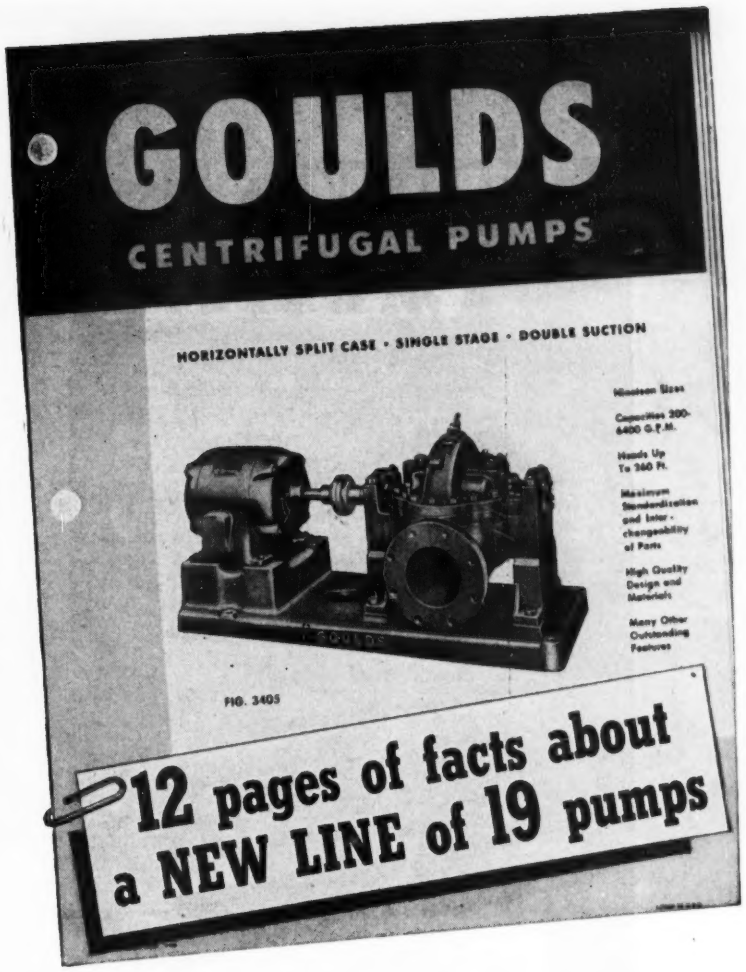
Steps in the process comprise: (1) Tempering the raw cereal with water to insure uniformity in moisture content, (2) removing air and then substituting an atmosphere of steam; (3) increasing steam temperature and pressure to raise moisture content of cereal and cook it; (4) instantaneously reducing pressure and exploding cereal into a vacuum chamber, causing an expansion of the grains, and (5) maintaining a reduced pressure in the expansion chamber sufficient to cold-set the expanded product.

Moisture content, cooking time, temperature and pressure, and vacuum into which product is fired are selected to produce a cereal that has a hydration rate at least ⅓ greater than that of the original grains after immersion in water at a temperature of about 200 F. for 20 min.

The oat product of this process has a volume 1⅔-3½ times the original grains. It may be cooked by adding one cup of the rolled oats and ¼ teaspoonful of salt to 1¼ cups of boiling water, and boiling 1 min. while uncovered. Then remove from fire and allow to stand covered for 2 min.

Detailed methods of treatment are given for oats, rice, wheat, farina, and hominy, although the process was devised particularly for oats.

Digest from U. S. Patent 2,653,099, issued Sept. 22, 1953, on an application dated July 2, 1953, to C. R. Carman, Park Forest, and J. E. Allison, Elmhurst, Ill., assigned to Guardite Corp., Chicago.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The quality of materials and extras of design that you have been able to get only by paying extra are *standard* on this new pump: stuffing box bushings, stainless steel impeller keys, Teflon water seal rings —to mention a few.

The Fig. 3405 carries interchangeability of parts far beyond anything we've been able to do before. Only three shaft and rotating parts assemblies (exclusive of impellers and wearing rings) provide for 19 pump sizes.

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Goulds PUMPS INC. Seneca Falls New York

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Coloring For Margarine

Improvement in means for coloring margarine is claimed for a patented composition comprising an aqueous gel in which is dispersed a powdered dye. Latter is soluble in the fatty phase but insoluble in water.

Gel prevents diffusion of dye until margarine is agitated, as by kneading, then it liquefies and readily mixes at room temperature. Any gelling agent may be used that is edible and which gives an aqueous gel that liquefies on gentle manipulation.

Preferred material is reaction product of partly deesterified pectin and edible water-soluble salt of calcium, magnesium or other suitable metal ion. To promote rapid solution of the dye it is desirable to emulsify in the gel a small quantity of fatty material, such as cottonseed oil. Some NaCl and cornstarch are added for mechanical reasons, although they are not essential.

Example of suitable composition, in percentages by weight, is: Water, 75.80; 3.7% solution of $CaCl_2.H_2O$, 1.60; low methoxyl pectin, 0.80; NaCl, 14.40; cottonseed oil, 0.40; dye, 0.57; cornstarch, 6.43. This composition is a thick viscous liquid which starts to gel at 105-114 F. It is poured into molds of suitable size and shape so that a 2g. pellet is sufficient to color one pound of margarine.

For convenience in handling and storage the pellets may be frozen and added to the margarine as the bags are being filled. Or, it may be injected into the interior of a congealed block of margarine and allowed to gel there.

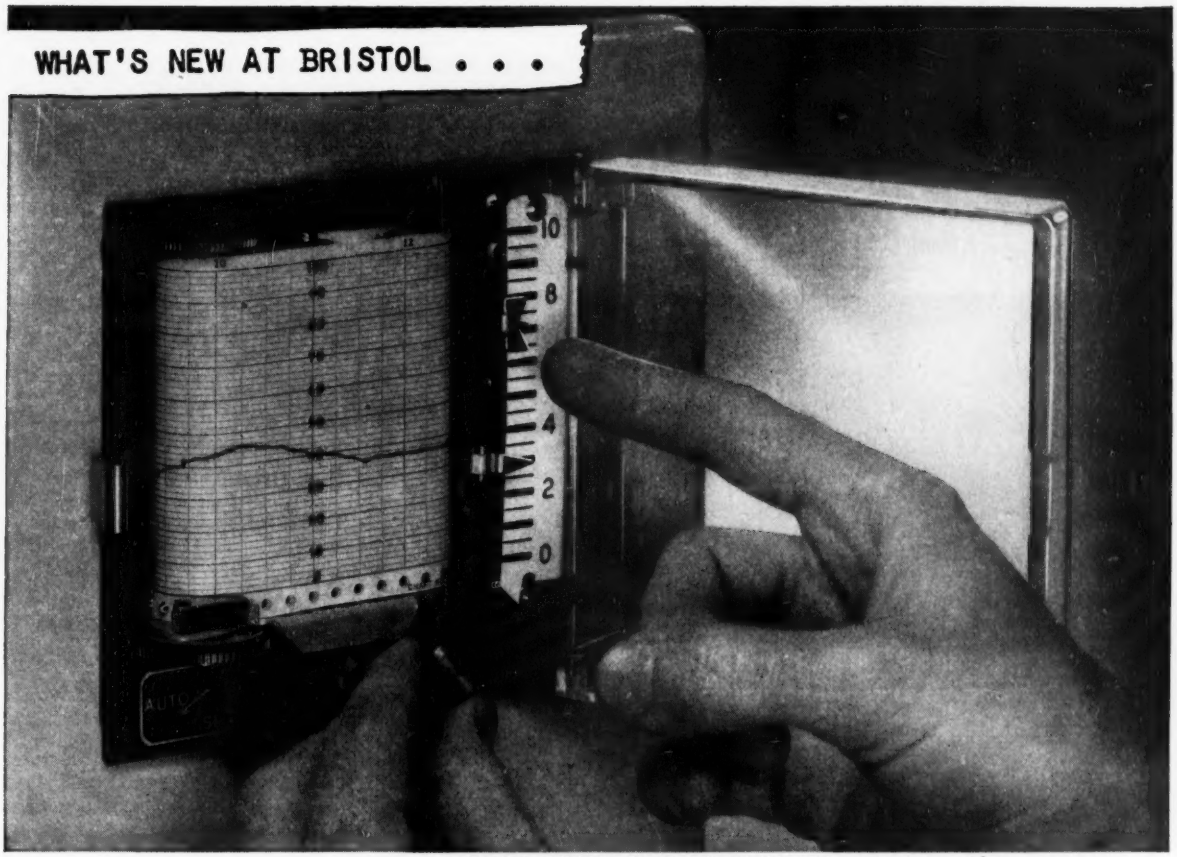
Digest from U. S. Patent 2,652,334, issued Sept. 15, 1953, on an application dated August 13, 1949, to W. E. Barch, Bronx, N. Y., assigned to Standard Brands Inc., New York.

Accuracy of Taste Panels

Sensory testing techniques involve subjective judgments, as do physical measurements, but differ from the latter in not having well-defined terms or measuring instruments.

They can be made to approach physical measurements by devising descriptive terms for flavors, odors, appearances, and other qualities in the phenomena under study. Also by assigning numerical values to them, training people to use the same descriptive terms for a given phenomenon, and then observing whether the descriptions are used consistently and what factors need control to increase this consistency.

Importance of training was demonstrated by results obtained with a



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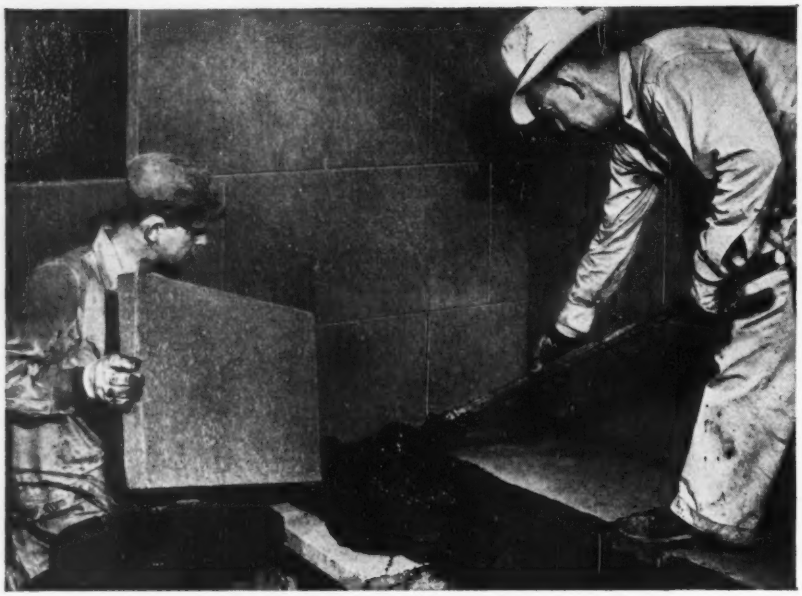

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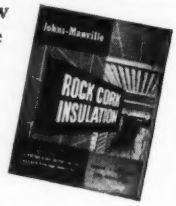

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scoring system devised to evaluate white fish stored in ice for 1-20 days. Panels using the scoring system for the first time placed the samples more or less in the same order as a trained panel, and had little difficulty with very fresh, or very stale, fish. Intermediate samples were scored with much less consistency by the untrained members, but with training in the use of the correct descriptive terms their consistency improved.

Complete objectivity for sensory testing is hard to prove but it is approached and becomes more plausible as results increase in consistency by training, as like samples give similar results, as results correlate with sample treatment and measurable physico-chemical criteria of quality, and as they are reproducible over a long series of tests.

Digest from "The Objective Approach to Sensory Tests of Food," by A. S. C. Ehrenberg and J. M. Shewan, *Journal of the Science of Food & Agriculture*, 482-89, Oct. 1953.

—*End*—

Better Soup Mixes

—*Continued from page 79*

the retorts, and cooling of his cans.

2. Economizing on packaging materials (cans, labels, and shipping cases) and freight costs.

These soup mixes also benefit the consumer by—

1. Saving on storage space.
2. Reducing the housewife's carry-home load from retail stores.
3. Providing both housewife and institutional user convenience in the preparation of soups.

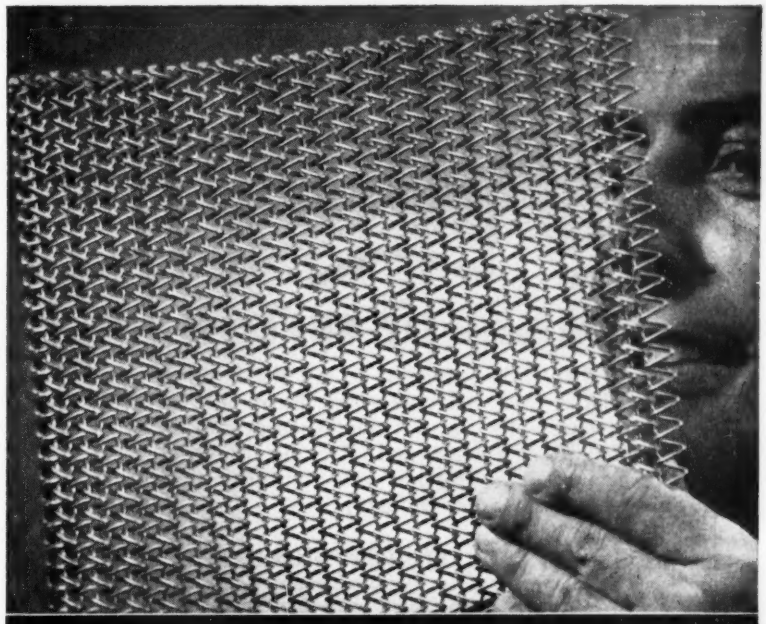
Moreover, dehydrated soup mixes offered for the institutional trade need not be used up all at once. A portion of the mix can be "spooned" from the jar and reconstituted with water, and the remainder can be used as needed.

A Look at the Operations

Briefly, operations at Mary Lynn's proceed in this manner: Ingredients are accurately scaled and then discharged into a horizontal, ribbon-type batch mixer. Here are blended the various soup bases as well as the dry mixes.

Soup bases are made from beef or chicken stock. A beef base consists of shortening, wheat flour, beef extract, and seasoning. Chicken base is essentially the same, except chicken fat and dehydrated or roasted chicken meat is substituted for the beef extract.

A dry mix, say for vegetable soup, may consist of about eight different dehydrated vegetables, such as pota-



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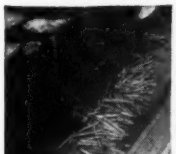
No matter how you look at it, the best all-around conveyor belting for food processing is WOVEN WIRE . . . by Cambridge. Available in any size, mesh or weave, and in any metal or alloy. Your Cambridge Field Engineer can recommend the best type of woven wire belting for your plant. Write direct or look under "Belting-Mechanical" in your classified phone book for the Cambridge man nearest you.



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CHEMISEAL TEFLON-JACKETED GASKETS are available in any size, with a variety of filler materials suitable for glass, glass-lined, porcelain-lined and metal piping and equipment. These fillers are protected on both faces and the inside diameter by the inert Teflon* Jacket. Ask for Catalog No. 1-339 WA.

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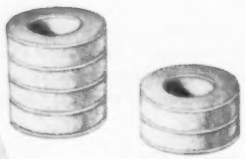

CHEMISEAL PUMP PACKING is extremely effective for rotating and reciprocating shafts. Provides a low friction 2-way seal that not only prevents axial seepage, but also seals against shaft and stuffing box as well. Supplied in sets to meet specific requirements. Ask for Catalog No. 711.

*du Pont trademark

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toes, parsley, tomatoes, carrots, and peas.

Beef and chicken broth mixes (actually soup bases) and French lentil soup mix are filled into 1-lb. jars with a single-spout Stokes filling machine.

Filling of soups comprising a soup base and dry mix is a two-step operation. First, the required amount of soup base is introduced into each jar, then the dry mix is added. These dry mixes may consist of a blend of dehydrated vegetables, or of rice, noodles, or toasted onions.

Jars are finally sealed and fed to a wrap-around labeler, then packed 24 to a case.

Variety—Plus

Included in the 50-odd dehydrated vegetable soup mixes packed by this firm are those that are sugar-free, salt-free, fat-free, low in seasoning, high in caloric value, or vitamin-enriched.

Something food processors should not overlook is the broad increase in restaurant and institution demand for easy-to-prepare foods, like dehydrated soup mixes. A major reason for the rise is that more women are now employed than ever before and they have the money to spend "eating out."

But the extent they will continue to eat out will be influenced to a notable degree upon the quality of the meals. The food must be comparable, or better, than that made in the home.

Too, the restaurant or institutional user is seeking labor-saving, ready-prepared foods of superior quality. Top-quality dehydrated soup mixes fill the bill. Moreover, they are low in cost. A restaurant may, for example, serve soup prepared from a dehydrated mix for 2-3c. per portion.

End (*Resume reading on page 80*)

Better Rice

—*Continued from page 96*

future, and they concern primarily for living standards.

Rice enrichment is being extended in the rice bowl area of Luzon. It is now entering in part into the rice supply of about 1,500,000 Filipinos. However, the competition of unenriched rice at a slightly lower price is proving a serious obstacle.

During the Bataan experiment, premix was furnished free to the rice millers. This cannot be done with the much larger populations now involved, so it is necessary to sell the premix to millers to recover the actual cost of enrichment, about 12c. per 100 lb. of rice, from sales of the improved grain. The price advance is 1c. per *ganta* (5 lb.). The total cost of enrichment

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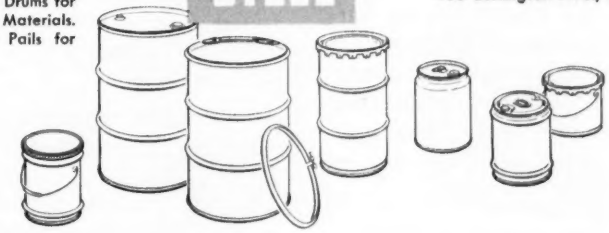

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in Bataan was 35c. per capita per year.

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INSIDE SCIENCE

The Vital Story of MARGARINE FORTIFICATION

How They Made Margarine a Better Food

by Science Writer

Over a hundred million pounds of margarine are used a month as a table spread, a tasty seasoning for hot vegetables and for many other purposes in cooking and baking. Included in the "Basic 7" food list, it serves as one of the finest and most concentrated energy foods. It is a shining example of a food which has been made repeatedly better.

In the original product which was invented more than 80 years ago, beef fats were used. Later these were replaced by lard and then by vegetable oils. When raw the latter, however, had several drawbacks: an unpleasant odor and taste, unsatisfactory color and a low melting point. These have been overcome by scientific refining methods, hydrogenation and use of certified food colors. Strictly phrased Federal Standards sponsored by the industry assure maintenance of very high quality, uniformity and nutritional value.

With this history of product improvement, it was natural that margarine makers would make their food a more valuable one by the addition of vitamin A. For over a decade many brands of table margarine were marketed with a label statement that they contained 9,000 International Units of vitamin A per pound. Now virtually all brands are fortified with vitamin A and the minimum amount supplied per pound is 15,000 I.U., an increase of over 66%.

Here are some of the benefits which vitamin A supplies. Scientific evidence is available showing that it helps to maintain normal vision and to overcome night blindness; that it increases the body's resistance to infections; that it promotes physical and mental development; and that it aids in maintaining normal glandular function.

Margarine makers who were accustomed to "fishy" odors and flavors when buying vitamin A sought a new source of supply. They found this new source in synthetic vitamin A—as produced by the famous synthesis evolved by the Roche research team headed by Dr. Otto Isler.

It was natural that margarine makers would adopt synthetic vitamin A for fortification of their products. When they were dependent on vitamin A extracted from fish liver sources, they found wide variations in vitamin A price. Synthetic vitamin A eliminated this disadvantage because its price is reasonable and stable. And a second disadvantage disappeared because synthetic vitamin A has absolutely no "fishy" odor, or taste, or after-taste!

Pure vitamin A and concentrates of it, produced by the Roche synthesis, have been approved by the Food and Drug Administration for use in margarine and other foods. It is light and clear in color.

Starting with citral, obtained from lemon grass oil, Roche vitamin A is built up through twelve manufacturing operations into a molecule identical with Nature's own.

At the huge Roche Park plant of Hoffmann-La Roche over 500 pieces of large-scale chemical engineering equipment in a multi-million dollar plant are working constantly to produce the superior Roche vitamin A.

Again, a development by the Roche people, who manufacture not only vitamin A but many other essential vitamins by the tons, has contributed to the making of a more nutritious food—and thus to the public welfare.

This article, reprints of which are available without charge, is published as a service to the food industry by Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul Street, West, Montreal, Quebec.

in Bataan was 35c. per capita per year.

The Philippine government has enacted a law prohibiting the sale of unfortified white rice. This becomes effective successively in each province by proclamation of the President, after all mills of the province are equipped with mixing machinery for adding the premix. This cost ranges from $50 to $200, according to size of the mill, and the government has appropriated money for this purpose.

At present, the mills of only three provinces are so equipped. Other nearby provinces also produce surplus rice for sale. And until their mills are equipped, and the prohibitory law is proclaimed in each of them, there will be great difficulty in preventing the continued invasion of the unenriched rice.

Poor people simply will not buy enriched rice when they can get unenriched at a slightly lower price. This is true all over the world. It is hoped, however, within the next year or two to cover the entire rice bowl area of Luzon, which produces about 60% of the rice of the Philippines.

Coming back to America, Puerto Rico is the region in which the greatest advance has been made in the use of fortified rice. The annual consumption there is about 140 lb. per capita per year, similar to that of other peoples of the Latin-American blood. Since Jan. 1, 1952, Puerto Rico has had a law in effect prohibiting the sale of white rice not containing specified levels of thiamine, niacin, and iron. The levels of these nutrients are the same as in enriched flour.

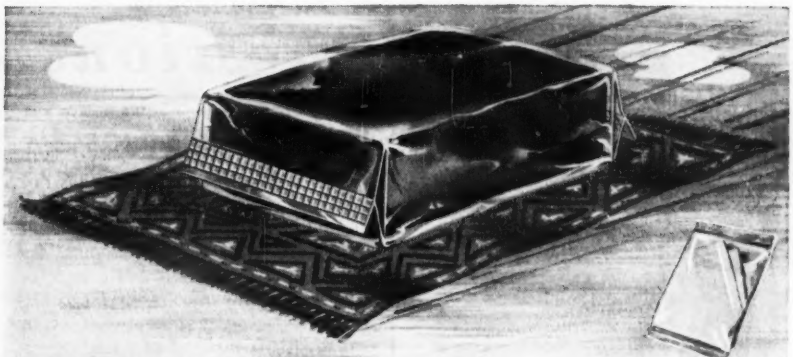
Puerto Rico's rice comes largely from California. And California millers produce the fortified rice.

Future Possibilities

The situation is much less favorable in Cuba, where long or medium grain rices are preferred. Cuba's rice since the beginning of the World War has come largely from the southern Mississippi Valley, where the preferred types of rice are grown. The southern rice millers have not taken kindly to the idea of enrichment by coating. And Cuban millers have not produced enriched rice.

Enrichment offers the American rice miller the means to expand his domestic market, as well as to hold the foreign market against future Asian competition. However, early general adoption in Asia, Latin American, and the rice-eating lands of Europe and Africa is not to be exepected because of the present shortage of dollars with which to buy the vitamins. But its adoption in Cuba, Hawaii, and Japan is inevitable within a few years.

End (Resume reading on page 97)



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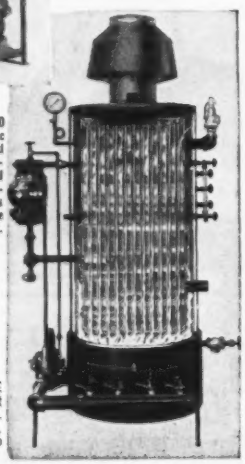
The M-K-O Automatic Boiler Feed returns condensate and supplies make-up water as needed to the KANE boiler.



The KANE Boiler, built to A.S.M.E. specifications, in sizes to 30 H.P.

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Questions & Answers

THIS MONTH'S PROBLEM

Question—Our production has not kept pace with increased sales of macaroni and spaghetti. We find that drying these long strands in our "dry rooms" is becoming a bottleneck in otherwise highly mechanized processing and packaging operations. Can you suggest a method of speeding up this step?

Answer to December Problem

The Question Was — Consumers are refusing to buy our potato chips as they have become slightly rancid. We've checked our operations and the quality of our shortening, but are unable to trace the cause. To the best of our knowledge, the only change was dressing up our product by packaging it in a colorful, transparent cellophane bag. Do you have any suggestions as to our difficulty?

Answer—It appears to us that your switch to colored bags may be the source of your trouble. Certain colors permit passage of those wave lengths of light that catalyze rancidity. Chips will show good keeping quality if you use colored bags (greens) that reflect these wave lengths.

Tests reported by J. H. Mitchell, Jr. (FI, Aug., p. 55, 1949) pointed out that light impairs quality of potato chips. Moreover, his investigations proved that there was less change in flavor in chips packed in green than in colorless or yellow bags.

Air-Conditioning Does It

Question—We've been running into a problem in our enrobing room. It involves a canvas-belt conveyor that sometimes travels crookedly and thus stops production. This belt carries cream centers from chocolate bottomer, over a Freon-refrigerated cooling slab, to chocolate enrober. Do you know what's causing this difficulty and how it might be avoided in the future?

Answer—Most likely, your operations are being carried out in a room that is not air conditioned. If this is so, then moisture is condensing on the cooling slab. This moisture, in turn is picked up by the belt. And the more moist the belt becomes, the more erratic will be its travel.

Moisture condensation is attributed to contact of warm, humid air with the cold slab. To overcome it, an air-conditioning unit should be installed to dehumidify the air. Then moisture content of the room air will be sufficiently low to prevent sweating by cooling slab.

Keeping Dressings Longer

Question—I am interested in learning if any of the newer antioxidants are being successfuly used to extend the shelf-life of French dressing or similar dressing products.

Answer—First of all, Federal Standards of Identity do not permit use of these antioxidants in French dressing at this time.

Then, too, none of the newer antioxidants are significantly effective in curbing rancidity in such vegetable oils as soya, peanut, or cottonseed. However, they do greatly extend the shelf-life of animal fats. Of course, these are not used in the preparation of French dressing.

Cottonseed oil becomes rancid just as well as soya oil, but it is a great deal more stable flavorwise. Soya oil tends to take on a painty or grassy flavor that some refiners claim to have successfully inhibited.

It may interest you to know that there has been a trend in the industry to extend the cold test of salad oils. Reason is that high-value cold-test oils reportedly produce more stable emulsions.

Formerly, an oil was considered satisfactory if it passed the New York Produce Exchange cold test—no precipitation of stearine after 5½ hr. at 32 deg. F. Now, there is a move underway to use inhibitors or solvent-crystallization methods for refining oils with high cold-tested values—for example, 75-100 hr.

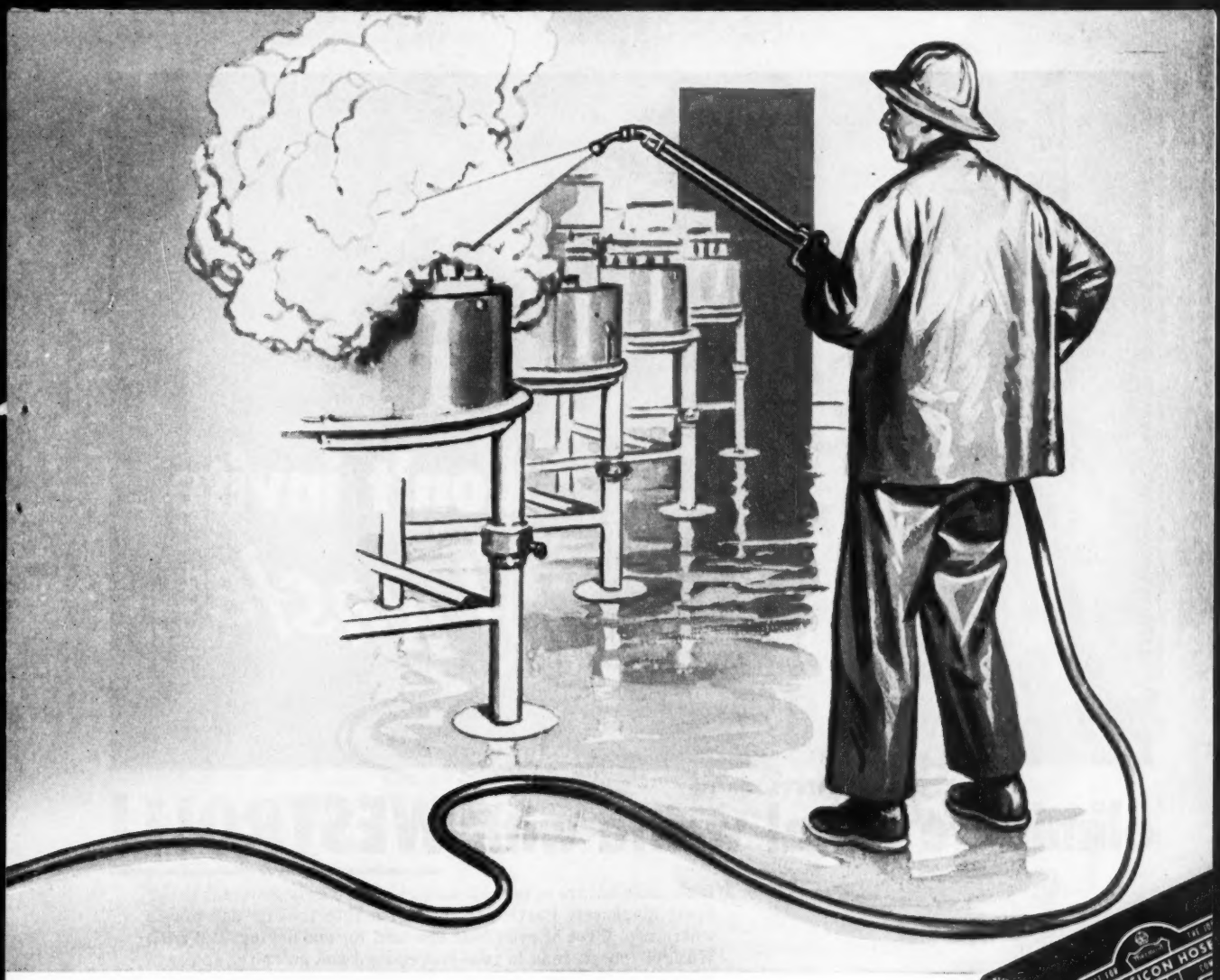
How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise.) We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers, Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.



Thermoid Hose designed specifically for use in food processing plants

Thermoid Industrial Rubber Products — Quality Service

Thermoid designs and manufactures many types of hose for a wide variety of specific industrial applications. These 3 are ideal for use in food and beverage plants:

VERSICON most versatile hose ever developed. Handles air, water, oil, gasoline, dilute acids and gases.

CREAMERY for use with hot or cold water and low pressure steam, for cleaning and sterilizing.

BREWERS for use in breweries, wineries and food plants. Imparts no taste or odor.

Thermoid research is responsible for new, better constructions that make Thermoid hose easier to handle . . . wear longer. Ask your Thermoid Distributor for the hose best suited for your job.

Conveyor & Elevator Belting • Transmission Belting
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eliminate towel waste with WESTROLL!

The Westroll towel dispenser has relatively few working parts, so its maintenance factor is negligible. Westroll dispensers are streamlined, easy to keep clean. They assure a constant supply of towels, help keep washrooms spic and span, save costly janitors' time.

It's human nature to take advantage of an overly generous paper towel dispenser. Particularly so with interfold or flat towels where two, three or even four are used for one drying. But with Westroll, people tend to take just enough and no more. You save as much as 40% on towel costs.

Tests show Westroll users average only 17 inches of paper, against 22, 33, or 44 inches of interfold. Users can crank out exactly the amount of towel necessary – even as little as two inches for lipstick removal! These are immediate savings.

You also save on maintenance. One filling of a Westroll micromatic dispenser is equivalent to *four* fillings of the ordinary flat-towel dispenser. Westroll dispensers are loaned and maintained by West.

Westroll towels are outselling our interfold towels 20 to 1. No customer has ever switched back to interfold towels after trying Westroll!

WEST DISINFECTING Company

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WANT DETAILS?

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Dept. 8

I'm interested in:

☐ A FREE leaflet on WESTROLL.

☐ A talk with a West expert about my washroom problems. No sales pitch. No obligation. Just discussion and a demonstration if I want it.

About Controlling Humidity

Question—Someone told me that you can't control humidity in a cold storage room with cooling coils. Is this true?

Answer—To some extent this is true. Cooling coils do not permit addition of moisture to the air.

Condensation in the form of frost will collect on cooling coils if their temperature is below the air's saturation temperature. And, the lower the temperature, the greater the condensation and dehumidification.

Where moisture must be added, humidifiers should be installed.

Preparing Clam Chowder

Question—We plan to get into the production of canned seafoods by first putting out an A-1 quality clam chowder—the Manhattan type. Can you furnish us complete directions for its manufacture?

Answer—Here are directions for making a batch on a small pilot-plant scale. You can then alter ingredients to suit your taste:

Simmer in small steam-jacketed kettle, 3 lb. of diced onions. When onions are soft, add 3 lb. of ground salt pork. Saute until pork and onions are soft, but not brown. Pour in 2½ gal. of water and bring to boil.

Meanwhile, blend until smooth in a vertical, beater-type mixer, 5¾ lb. of cracker crumbs with 2½ gal. of water. Bring together cracker-crumb mix with boiling onions and pork in jacketed kettle.

Beat up a second batch of cracker crumbs—5 lb. of crumbs with 1¾ gal. of water. Then pour 2½ gal. of water into kettle, bring batch to a boil, and add second batch of crumb mix. Again bring to boil and introduce tomatoes (contents from four No. 10 cans), 2⅔ lb. of salt, and ⅞ oz. of pepper (white).

Pump this soup stock into hopper of a syrup-type filling machine, which is commonly used in fruit canneries.

Peel, de-eye, and dice potatoes,

Q.—Can you tell me how to prevent hulls from floating in the gasoline layer when carrying out the Wildman trap-extraction technique for determining presence of extraneous matter in raw peanuts?

A.—Try using a surface-active agent, Tween 80 (Atlas Powder Co., Wilmington, Del.), and a chelating agent, Versene (Bersworth Chemical Co., Framingham, Mass.).

We invite you to make this test...

Soak it, Boil it, Grease it—Patapar can take it!

You don't have to jump into a swimming pool to test the wet-strength of Patapar Vegetable Parchment. Just put a sheet under water. Soak it for weeks . . . or boil it. Patapar retains its amazing strength and beauty.

When it comes up against grease, fats or oils it resists penetration. One type of Patapar (27-21T) is so grease-proof that drops of oil placed on it stay on the surface in little globules – they do not "creep" or seep through.

Many different types for many different jobs

Patapar is produced in different types or variations that meet all sorts of exacting requirements. Some of its diversified uses: wrappers for butter, poultry, margarine, ham, bacon, cheese and other moist foods; milk can gaskets; rubber releasing separators; white print translucent masters for direct print machines; dialyzing membranes; in hospitals for wrapping articles to be sterilized in live steam. It is furnished in sheets or rolls – plain or beautifully printed.

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HAVE YOU CONSIDERED

enzymes

FOR *your* PROCESS?

diastases

For liquefaction and hydrolysis of starch to produce soluble dextrins and sugars — also, to remove starch causing filtration problems and turbidity. Produced from several sources to operate under varying conditions of temperature, pH, time, etc.

proteinases

For modification and hydrolysis of proteins into polypeptides and amino acids.

glucose oxidase

— an enzyme system containing catalase — for the removal of undesirable glucose or oxygen from food and industrial products.

More detailed information concerning these or more specialized enzyme products may be obtained by writing our technical service department

TAKAMINE

TAKAMINE LABORATORY, INC.

Clifton, New Jersey

which are then blanched to prevent darkening. Thoroughly wash shucked clams to remove sand. Before grinding clams, remove siphon and stomach.

Now fill into "C" enamel-lined No. 1 cans, 2 oz. of potatoes and a similar amount of ground clams. Add enough hot soup stock to fill cans, which are then sealed and heat-processed for at least 50 min. at 240 deg. F.

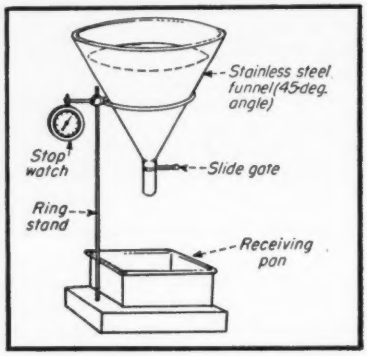
Measuring Powder Flow

Question—We would like to measure the flowability of our powdered milk products. Are you familiar with equipment available for this purpose?

Answer—If you are referring to an instrument for measuring flow of milk powders, then you might look into the possibility of using the Massometer. This gravimetric-type device (manufactured by Wallace & Tiernan Co., Newark, N. J.) measures free-flowing solids through a vertical pipeline.

However, if you mean the ability of the milk powder to flow, then your questions cannot be easily answered. But we do offer this possible solution.

Construct a polished, stainless steel funnel-shaped hopper to hold a standard amount of powder—say 5 lb. (see diagram). Attach a slide gate to discharge spout of funnel, which is secured to a metal ring stand. Slope of the hopper should be at an angle of at least 45 degrees. And this angle should be standardized to permit measurement of flowability of milk powders.

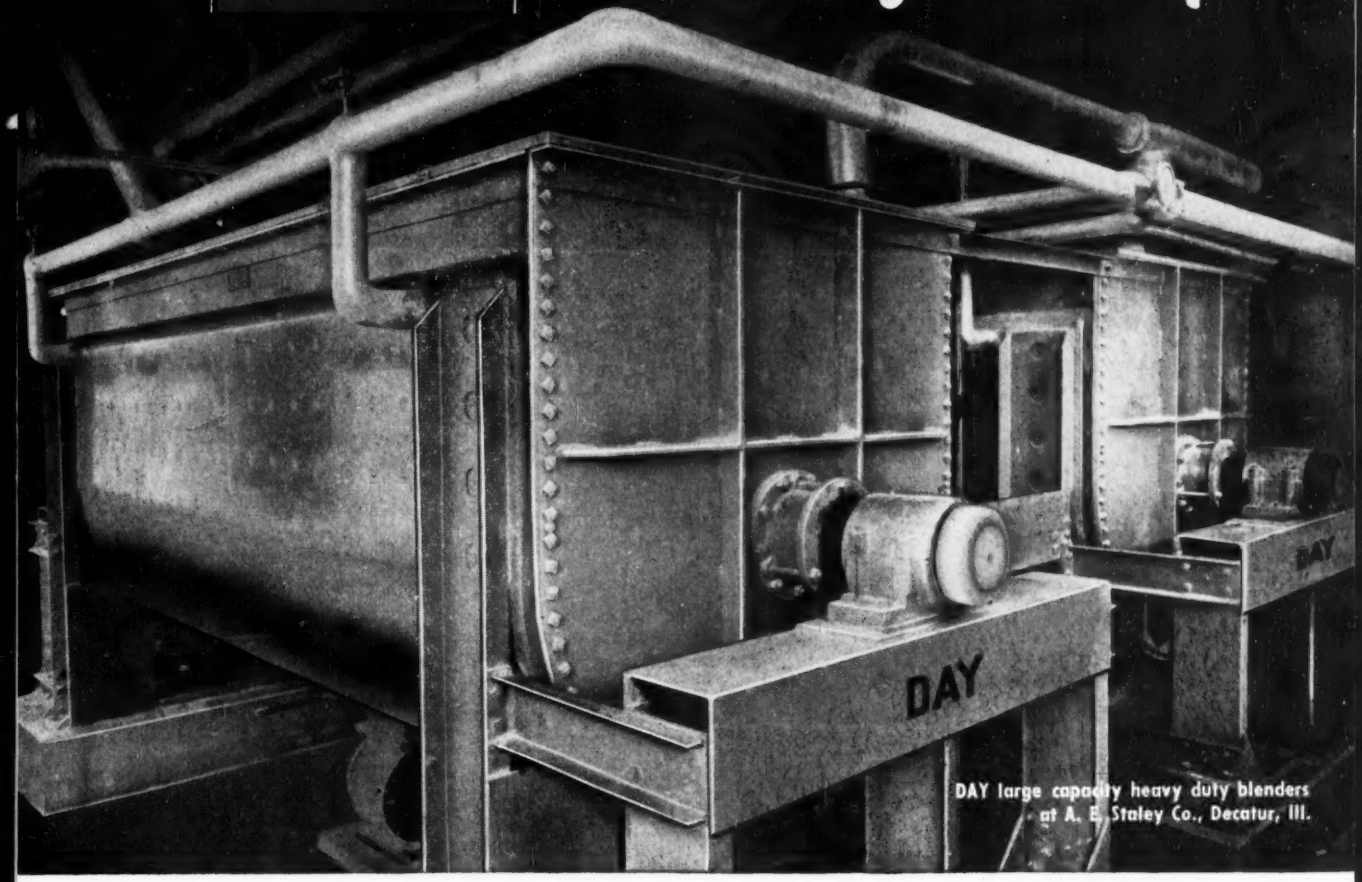


Measurement of flowability or fluidity would then merely require timing, with a stopwatch, emptying of powder from funnel hopper.

More On Sherry Question

"Referring to your January Q&A on the solera system of aging sherries, nothing was said about other steps necessary in the production of Solera

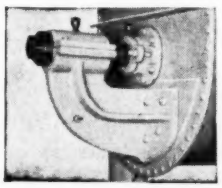
DAY means longer life span



DAY large capacity heavy duty blenders at A. E. Staley Co., Decatur, Ill.

Rugged construction plus precision engineering . . . that's the DAY combination that means *extra* years of trouble-free, economical operation. Plant after plant is finding this true. Whatever your special need, you'll find a DAY Heavy Duty Blender designed for you. Special DAY features on this Heavy Duty Blender have been developed to provide top performance and extra-long equipment life span. The DAY dry color agitator is designed for heavy bodied powders. Other types of agitators are available to meet specific requirements. DAY large outboard bearing construction gives maximum shaft support, smooth operation. Exclusive stuffing box design prevents bearing damage from abrasive materials, and eliminates danger of product contamination by bearing lubricants. The DAY spiral ribbon agitator is designed for paste, semi-paste, granular or liquid products. For complete information or service, call your nearest J. H. Day field engineer or write for Bulletin 354-A.

DRY COLOR AGITATOR



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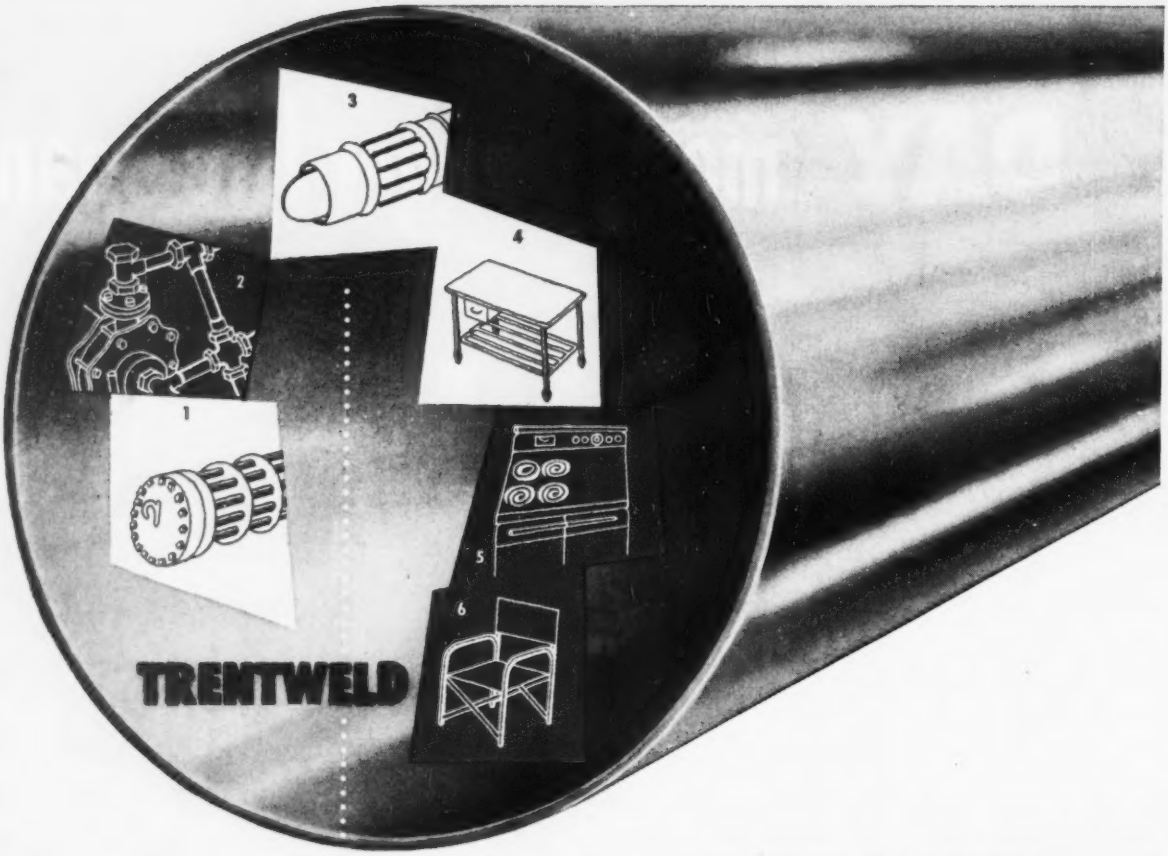

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ORNAMENTAL TUBING

From the scorching heat of jets and the processes of atomic energy to the delicate handling of pharmaceuticals and dairy products, TRENTWELD *welded* stainless steel tubing has proved its ability to outperform other types.

TRENTWELD tubing is produced by tube mill specialists from accurately rolled sheet and strip. The exclusive welding process employed provides an exceptionally sound weld — just as strong and corrosion resistant as the body of the tube itself. No filler rod is used, and even by casual observation the superiority of TRENTWELD is evident.

These advantages account for the popularity of TRENTWELD stainless tubing for many different applications . . . aircraft, beverage, chemical, dairy, food processing, pulp and paper, and household articles. For each of these uses and many others there are many grades, gauges and finishes of TRENTWELD. And TRENTWELD is available in a wide range of sizes from $\frac{1}{8}$" to 40" O.D. Write today, and let us help you solve your tubing problem.

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For more information, use coupon on page 159.

sherries. True, your answer to the question on the solera system was correct. But you can't produce a Solera sherry by the solera system alone. Two other steps are traditionally Spanish—using true varietal grapes, like the California Palamino, and employing the flor-yeast process of wine fermentation.

The characteristic "nutty" flavor of a fine Spanish sherry is acquired from flor (Spanish for flower) yeast. Cells of this yeast form in dainty rosettes, like flowers, on the surface of the wine. And, in Spain, growth of flor yeast is encouraged by keeping the barrels open."—FE reader.

Re Low-Calorie Dressings

Question—We'd like to extend our line of dressing products by including a dietetic salad dressing. Do you have formulas and details for manufacturing this product?

Answer—We do not have formulas for dietetic salad dressing.

Inasmuch as you are a chemist, it should not be too difficult for you to work out your own. Our suggestion is that you purchase jars of commercially packed, low-calorie, low-sugar salad dressings from local retail stores. Then set up a hypothetical formula, based on ingredients listed on the labels and the caloric content of the dressing.

Ingredients listed on the label of a jar of low-calorie, low-sugar salad dressing that we picked up in a local market included: water, distilled vinegar, cottonseed oil, egg yolk, salt, specially prepared pectin, gum tragacanth, spices, monosodium glutamate, and 0.03% saccharine salt (a non-nutritive, artificial sweetener). Caloric content appearing on the label was 16 per tablespoon-serving.

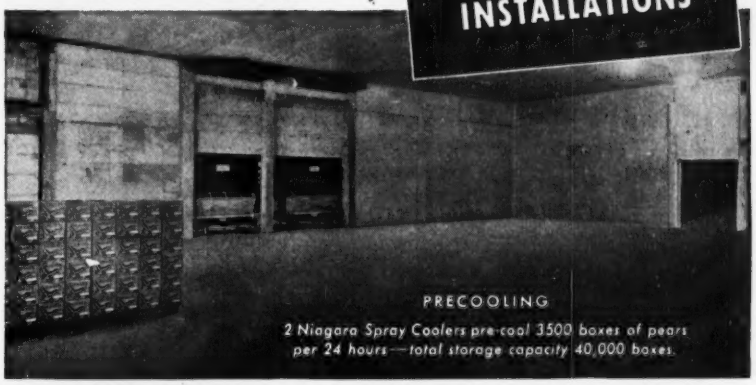
Don't make the mistake of using mineral in place of a vegetable oil, otherwise interstate shipments will likely be seized by Food & Drug inspectors.

Q. Deterioration of rubber tires on portable racks is a problem in our sausage-manufacturing plant. Seems like the grease on the floors quickly eats into the rubber. Is there a better tire that we can use or some way we can treat them to make them last longer?

A.—Why not look into the possibility of using neoprene tires. We understand that they are being offered for about the same price as ordinary rubber tires. And more important to you, neoprene tires are highly resistant to greases, tear, and abrasion.

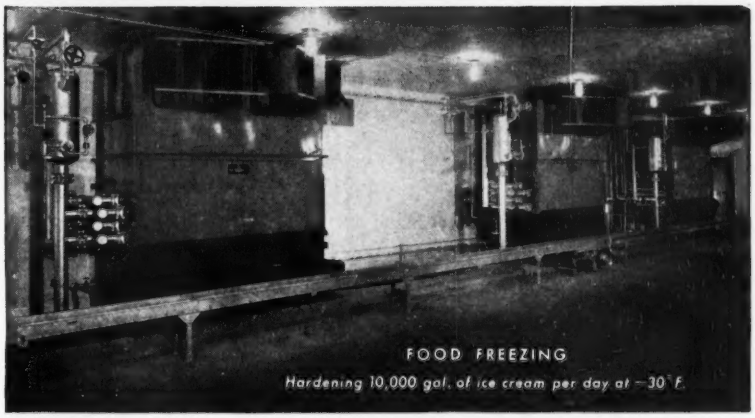
NIAGARA "No-Frost"

SUCCESSFUL IN BIG INSTALLATIONS



PRECOOLING

2 Niagara Spray Coolers pre-cool 3500 boxes of pears per 24 hours—total storage capacity 40,000 boxes.



FOOD FREEZING

Hardening 10,000 gal. of ice cream per day at −30° F.

FROZEN FOOD STORAGE

Room 80 ft. x 135 ft.—Temperature −5° F.

NIAGARA "No-Frost" gives you extra capacity and better operation. It improves quality, especially in foods, where it brings the product to correct temperature faster and holds it without fluctuation. It saves money for you in the cost of power and labor. With Niagara "No-Frost" there is never any "de-frosting" loss of time or temperature rise.

Write for Bulletin 105

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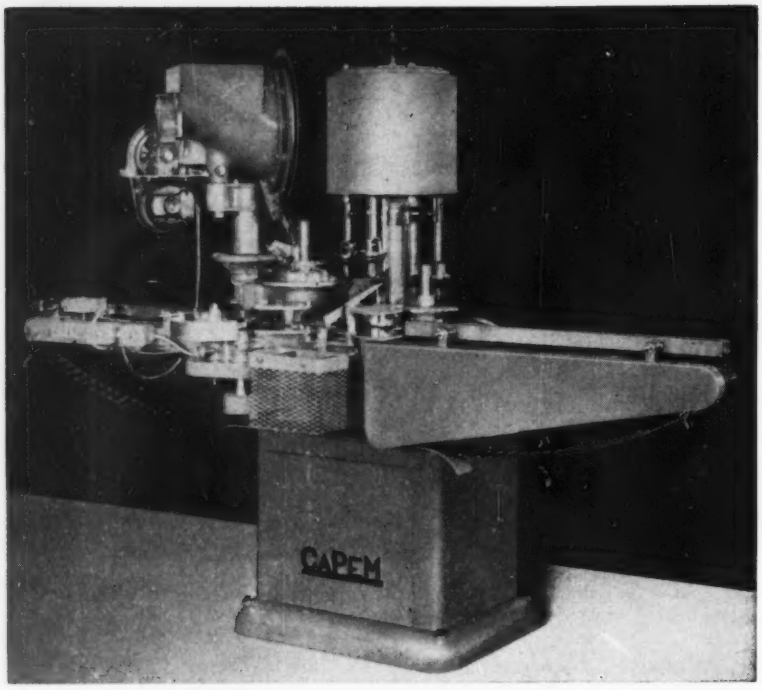


CAPEM

THE MODERN SCREW CAPPER

- Applies any type of standard screw cap or cover at speeds of 2000 to 10,000 per hour.
- Takes container from conveyor line, applies cap perfectly, and returns container to conveyor AUTOMATICALLY without intermediate handling.
- Handles bottles, jars, cans or jugs of any size or shape.
- Delivers a perfect, LEAKPROOF seal at low cost.
- Available in 1, 2, 4, 6 and 8 spindle models.

Write for prices and delivery.

CONSOLIDATED PACKAGING MACHINERY CORP.
BUFFALO 13, N.Y.

Starch (in the form of a viscous starch-vinegar slurry) is used in regular salad dressing, along with egg yolks, as the stabilizer. From the above listing of ingredients, you can see that starch has been omitted (because of its high caloric content) and substituted with the stabilizers, pectin, and gum tragacanth.

Wants Disposable Work Caps

Question—We are not satisfied with the re-usable cloth caps used by our bakery workers. Trouble with these caps is that laundering damages the cardboard stiffener in the visor. While this does not impair the cap's use, the cap does lose its wearing appeal. One of our associates suggested that we look itno the possibility of adopting disposable, plastic-treated paper caps. Have you any information on such caps?

Answer—There are caps made of neoprene-treated kraft paper that provides high wet strength. The paper is crepe-textured and sewn together in much the same manner as cloth caps. It also has a leatherette sweat band and a cardboard-reinforced visor.

Reportedly, they do not collect dust as readily as cloth caps and take wear about as long. They are lighter in weight and retain their shape well.

Price is about 20¢ per cap, compared to about 30¢ for cloth ones.

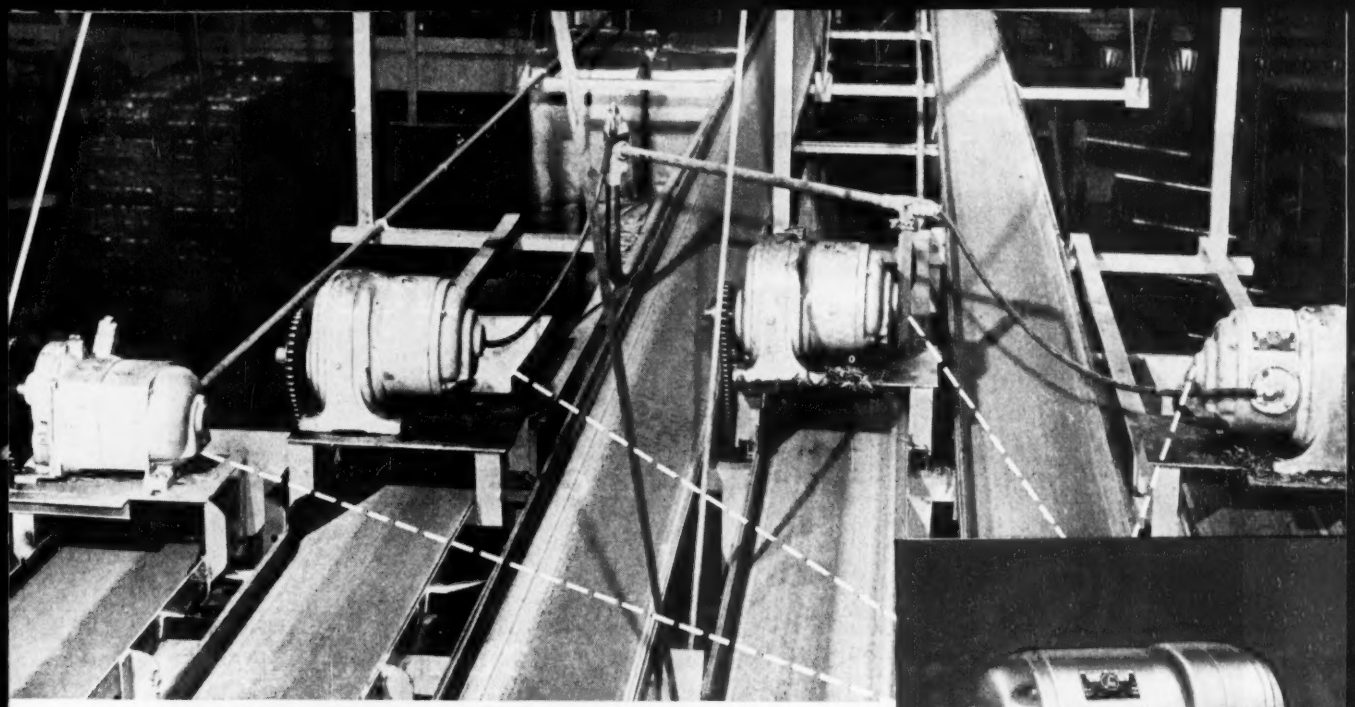
Advice on Lift Trucks

Question—We are considering using fork-lift trucks in our cannery. We wish to operate them mostly in warehousing and shipping areas, but would also like to use trucks in our processing departments. Originally, we thought of purchasing electric trucks, but more recently we've been favorably impressed with some new gas models. Too, diesel and so-called LP models are now being offered. Could you suggest how we can select the best type for our particular requirements?

Answer—It is almost impossible to offer a clear-cut decision without complete analysis of the buildings and loads involved. However, a few general principles may be mentioned which should help work out the problem to suit your own conditions.

Generally agreed to favor selection of gas trucks are: Lower initial cost, slightly higher speeds, no end-of-shift or overtime slowdowns, better performance over ramps (over 10 percent), and no battery charging or maintenance.

Favoring electric trucks, on the other hand, are: Freedom from fumes,



STERLING SLO-SPEEDS DRIVE CONVEYORS AT PAULUS BROS. PACKING CO.

Over 185 installations of Sterling Electric Power Drives during the past 10 years at Paulus Bros. Packing Co. are giving outstanding service... rugged, compact Slo-Speeds assure minimum maintenance, require minimum installation space, and their streamlined design permits easy, efficient cleaning which is so necessary in a cannery, reports G. G. Perkins, Mechanical Superintendent at Paulus.

INDUSTRY NAMES SLO-SPEED PRODUCTION ADVANTAGES

In a nation-wide user survey of Sterling Slo-Speed Geared Electric Power Drives:

86% Lowered Maintenance Costs. **56%** Increased Plant Safety. **76%** Reduced Lubrication Requirements. **56%** Obtained Better Protection Against Outdoor Exposure. **46%** Required Less Installation Space. **40%** Achieved Greater Cleanliness. **10%** Reduced Power Costs. **22%** Increased Production. **56%** Simplified Installations. **32%** Improved Employee Morale. **12%** Achieved Quieter Operation. **38%** Modernized Equipment and Machines for Better Performance, Better Appearance.

Investigate the possibilities of bringing some of these Slo-Speed production advantages to your plant. Sterling Engineering Sales Offices and over 400 Distributors and Service Shops throughout the nation effectively serve every industrial, commercial and agricultural area.

20-PAGE ILLUSTRATED CATALOG
Sterling Speed-Trol, Slo-Speed, Klosd and Klosd-Tite Electric Power Drives. Write for catalog No. B-419.

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Sterling Klosd and Klosd-Tite Motors—for constant normal speed at its best

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Here's a new idea that can preserve almost indefinitely the delicate flavors that go into dessert mixes, cake mixes and similar food products. Volatile flavor oils can now be protected in a stable, solid form by means of a process developed and patented by Atlas.

The process consists of trapping the oil in solid sorbitol. You mix or emulsify the essential oil in molten sorbitol, allow the mixture to solidify, then work it into pellets, flakes, rods or tablets. The low temperatures involved avoid damage to delicate oils. The resulting solid is completely non-volatile, except when powdered extremely fine. It can be incorporated into mixes and packaged in paper containers with less loss of flavor. And it dissolves readily in water.

Sorbitol is ideal for this purpose because it is a wholesome food ingredient, having a non-distinctive mild sweet taste. It is readily available in crystalline form or in the more economical 70% solution (sold under the trademark SORBO), either of which is suitable.

Atlas specialists will be glad to work with you in applying this unique process to your own flavor oils. For details and for technical assistance, write or call Atlas today!

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ATLAS POWDER COMPANY, CANADA, LTD.
BRANTFORD, CANADA

less fire hazard, and possible lower average maintenance costs for life of the truck.

This is one of frequent situations when the pendulum seems to swing first one way and then the other. Recent advances in fluid and electromagnetic drives, for example, have improved the relative position of gas power in the matter of maintenance. At the same time, new catalytic mufflers have reduced fume difficulty.

It is not our intention to take sides in this matter. Doubtless, it could be said that any appreciable increase in battery life would quickly shift the balance again to electric trucks.

In general, it would be our expectation that if your trucks are to be used to a great extent in non-processing areas and must be operated for long shifts during cannery-pack season, odds would favor gas trucks with one of the new, improved drives and perhaps a catalytic muffler.

However, it would be well to check your fire insurance company before making a final decision. Then you will be certain that the storing and handling of gasoline on your premises will not increase the insurance premium and thus offset any advantages previously outlined.

On the matter of diesel trucks, it is our own impression that they are chiefly used now for heavy-duty outdoor jobs. LP trucks might be practical, depending upon availability of this type of fuel. This point must be carefully checked from cost and safety angles before making a decision.

Q.—When referring to corn syrup, what is meant by D. E.?

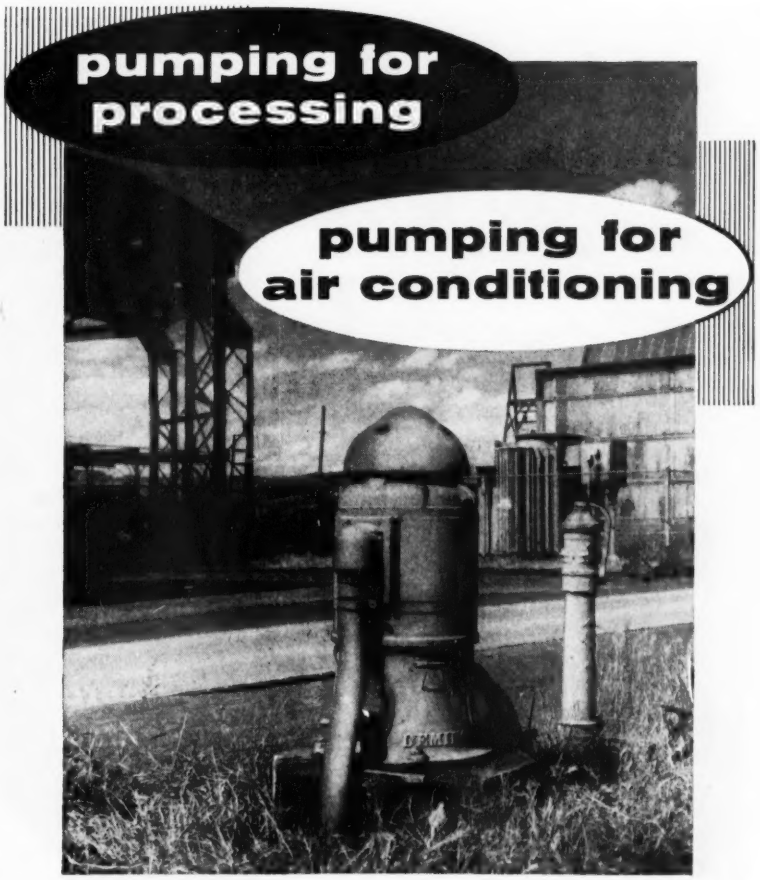
A.—It is the abbreviation for dextrose equivalent, or the percent of reducing sugars on a dry basis in a product, calculated as dextrose.

Mint Jelly Formula

Question—We'd like to manufacture a mint jelly—colored green. Can you furnish us with processing instructions?

Answer—Into a steam-jacketed kettle of suitable size, add 13¾ lb. of water. Turn on steam, and introduce 25 lb. of granulated sugar. Cook to 220 deg. F. and add sufficient pectin to set the jelly. (Amount should be determined by previous tests or check with supplier.) Check soluble solids content of jelly. If it is 65%, then turn off steam and add 0.4 fl. oz. of spearmint oil and 0.25 fl. oz. of color.

To prepare the color solution, mix



multi-duty SERVICE with DEMING PUMPS

Pumping well water at a temperature of 52° for air conditioning and then to a central reservoir for other factory uses is the multi-duty service of five Deming Vertical Turbine Pumps at a Remington-Rand plant in Elmira, N. Y. Installed in 1942, three of the pumps operate 9 hours a day and two pumps run continuously. Since 1942, only one of the five pumps has been pulled for maintenance.

Send for BULLETIN NO. 4700-51

Important facts about Deming Vertical Turbine Pumps are in this illustrated bulletin.

THE DEMING COMPANY
556 Broadway • Salem, Ohio, U. S. A.

Specify DEMING PUMPS

For more information, use coupon on page 159.

Now you can have as many as 9 unit weights—each equivalent to the dial—in the new Toledo cabinet heads! This means that a dial as low as one-tenth the total capacity of the scale can be used to provide wide indicator travel on small loads, without sacrificing high total capacity for the scale. A convenient crank-type control operates the unit weights—no lever to lift. Available in heavy-duty floor, built-in, hopper, monorail, motor truck and other types.

44 Ways Better... More new features in the great new line of Toledo Industrial Scales include—double pendulum mechanism in one-piece sector design . . . dial can be installed to face any one of eight directions . . . new clean-line design with handsome gray finish. Write for new condensed catalog No. 2001. Toledo Scale Co., Toledo 1, Ohio.

Model 2151—Floor Scale equipped with Unit Weights.

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1.7 oz. of tartrazine and 0.4 oz. of guinea green in a 1,000 ml. beaker. Then thoroughly dissolve in sufficient water to bring volume to 1 qt.

Fill into jars at 200 deg. F. Then cap, label, and case.

Vacuum-Eviscerating Poultry

Question—I have looked through past issues of FOOD ENGINEERING *and was unable to find any information on water-type vacuum ejectors for eviscerating poultry or fish. Can you furnish me with information on the use of vacuum systems for my purpose?*

Answer — There are two vacuum systems possible for eviscerating poultry and fish. One involves the use of a pump to produce a vacuum and the other depends upon a steam jet for air evacuation.

For your purpose, a vacuum of 14 in., or higher, is preferred. To sustain such a vacuum with a water-type ejector (especially with multiple suction tubes), an excessive amount of water, at undue cost, would be required.

If you wish to investigate cost and performance of steam-jet ejectors, we suggest that you contact manufacturers of such units. We might point out that the initial cost of a vacuum-type pump may be more than a steam ejector.

In any event, advise the manufacturer of the size and number of eviscerating nozzles and the steam pressure on your boiler.

Three Kinds of Muffins

Question—Do you have formulas and directions for making bran, corn, and blueberry muffins?

Answer—Bran muffins are made by soaking for 1 hr. 1½ lb. of bran in 8 lb. of cold milk, 3 lb. of honey, and 3 oz. of salt. Stir in, 4 lb. of sugar. Sift and add 8 lb. of soft cake flour and 7 oz. of baking powder. Melt and stir in, 2 lb. of butter and shortening. Using wire beater, whip batch until frothy, and then thoroughly fold into batter 2 lb. of eggs. Dates, raisins, or nuts may be added to batter before dropping it into greased cup molds and baking at about 375 deg. F.

To make corn muffins, cream for 5 min.: sugar, 9 lb.; invert sugar, 2 lb.; butter and shortening, 5½ lb. Slowly add, while creaming, 4 lb. of eggs. Alternately introduce to make a smooth batter: bread flour, 16 lb.; baking powder, 1 lb.; corn meal (fine), 4 lb.; corn meal (coarse), 4 lb.; and milk, 20 lb. Add batter to greased cups and bake at about 400 deg. F.

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IT'S NO EXAGGERATION . . . many firms who have until now been forced to use expensive steel drums or pails, and to put up with high freight charges because of excessive package weight, are already reaping amazing dividends in lower costs all along the line—by switching to standard fibre shipping cartons equipped with *Durethene* Polyethylene Film Liners.

Polyethylene Liner Film, made by the most modern processes and to the most rigid specifications in our two large plants, has *high tensile strength* . . is impervious to moisture . . *won't crack, split or tear* . . is *inert* to most chemicals . . holds products safely with *no leaking or sifting.*

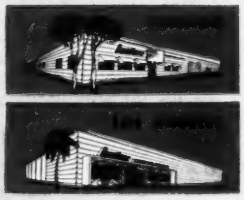
Besides costing less, *Durethene*-lined fibre cartons are easier to store before use; easier to handle in shipping and storage after packing. There is no recovery nuisance and expense. There are no filling problems. Corrosion and contamination of products is impossible.

If you are now using a less modern type of liner material, a change to *Durethene* Polyethylene will free you from sticking, tearing or contamination problems.

Make your own check-up on the great savings-potential for *your* products. We'll be glad to supply working samples of *Durethene,* and to work closely (and without obligation) with you, your carton source and a progressive *Durethene* converter in your area, in developing exactly the right package for your needs. Write or phone us today!

DURETHENE FILM LINERS FOR MULTI-WALL BAGS are doing a remarkable job of protecting well-known products against moisture gain or loss, contamination, sifting.

- **DURETHENE Polyethylene Film is also widely used by major packagers everywhere for consumer-packaging such products as *PRODUCE ★ POULTRY ★ FROZEN FOODS ★ POPCORN ★ CANDY ★ SOAP CHEMICALS ★ TEXTILES ★ COSMETICS ★ LEATHER GOODS ★ SPECIALTIES***



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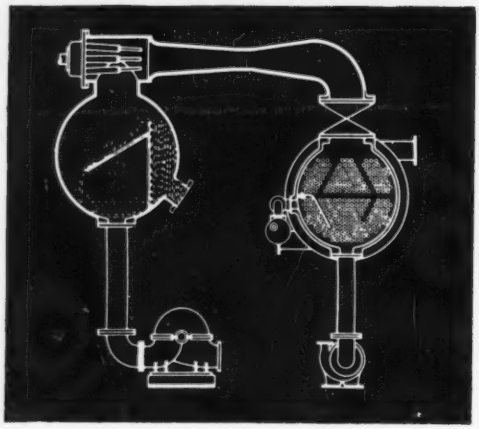

Water cools itself with a C-R Chill-Vactor

A Chill-Vactor is a three-stage steam-jet vacuum unit which serves to flash-cool water and certain other liquids through temperatures down to 32°F. No chemical refrigerant is used. There are no moving parts. Water literally "cools itself" by partial evaporation at high vacuum. Vacuum refrigeration is usually less expensive than mechanical refrigeration in first cost as well as operating cost.

Chill-Vactors are producing chilled water in industrial plants throughout the world. They are cooling chemical solutions, fruit juices, milk, whiskey mash, etc. Bread and other baked goods have been vacuum cooled successfully for years. Other products, such as lettuce, spinach, celery and other leafy vegetables, are being cooled to temperatures around 33°F. in quantities up to 200 cars a day.

The Chill-Vactor is only one type of steam-jet Evactor manufactured by Croll-Reynolds. Let our technical staff help you with any or all of *your* vacuum problems.

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CHILL-VACTORS • STEAM JET EVACTORS • CONDENSING EQUIPMENT

Blueberry muffins are prepared by creaming: sugar, 8 lb.; butter and shortening, 6 lb.; salt, 5 oz.; and lemon extract, if desired. Now slowly add 2¼ lb. of eggs. Alternately mix 16 lb. of soft cake flour, 10 oz. of baking powder, and 12 lb. of milk. Blend with batter, with very little mixing, 12 lb. of blueberries. Drop into greased cups and then oven-bake at 375 deg. F.

Drying Mushrooms

Question—Can you furnish me with details on dehydrating cultivated mushrooms, which I propose to pack in hermetically sealed containers?

Answer—Cut roots from mushrooms and then a portion of stem fairly close to cap. Roots, of course, are discarded.

How you wish to pack the mushrooms will depend upon whether they are to be sold as slices, buttons, or stems and pieces. In any event, thoroughly wash mushrooms and remove blemishes.

Mushrooms should then be blanched sufficiently to prevent enzymatic discoloration. Dip mushrooms in a 1% solution of citric acid, and dehydrate in a forced-draft dryer at 140 deg. F. for about 12 hr. Moisture content of the mushrooms should be below 5% before packing them into hermetically sealed containers.

For additional information, refer to "Method for Quick Freezing and Dehydrating Mushrooms", by H. J. Brunell, W. B. Esselen, Jr., and F. P. Griffiths, Univ. of Mass., Amherst, Mass., and published in *Food Industries*, p. 74, 1943.

Making Chicken Liver Paste

Question—Do you have a formula for preparing chicken liver paste?

Answer—Soak chicken livers overnight in a 1% salt solution. Volume of this solution should be twice that of the livers.

Grind livers through 1-in. plate. Meanwhile, heat to boiling in steam-jacketed kettle, with enough water to cover, 85 lb. of bacon ends and 175 lb. of chicken meat. Then add 340 lb. of ground chicken livers, 8 oz. of liquid cure and 15¼ lb. of potato flour or corn starch.

Simmer until meat is cooked and transfer batch to silent cutter or chopper. Add 5¾ lb. of salt and 20 oz. of liver-paste seasoning and reduce to paste. Fill into 3¼-oz. cans and heat-process 60 min. at 240 deg. F.

Liquid cure is made by dissolving 16 lb. of salt and 20 lb. of sodium nitrite in 320 lb. of water.

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Rheem sets the standard for the entire steel container industry by taking care in preparing its steel for fabrication. Rheem provides clean, long-lasting drums.

Every minute particle of oxide "scale" is removed by Rheem shot-blasting, stopping rust and corrosion for years of dependable service.

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Shot-blasting process removes troublesome oxide "scale" from both sides of each steel sheet and leaves a clean, oxide-free surface. Then each sheet is rolled and leveled to insure a smooth, even surface necessary for precision roller-coating. Next, detergents, scalding water and revolving brushes scrub it clean. After rinsing and drying, the sheet is ready for further treatment.

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Once clean, each sheet is treated on both sides with a patented phosphoric compound to inhibit rusting. This is one more important step in Rheem's careful preparation of its steel to insure uniform adherence of the drum lining. This also makes it possible for Rheem Drums to withstand long periods of weathering. Finally, when required, special coatings are roller-applied and baked on to produce a tough, durable finish that protects your product from contamination.

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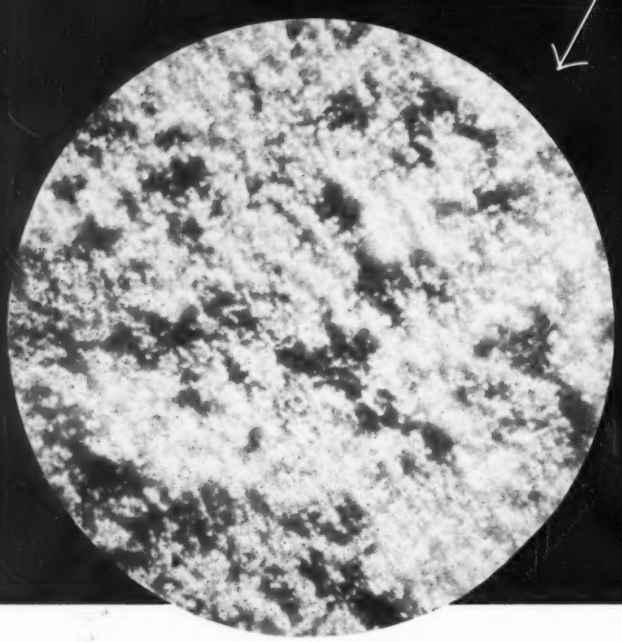

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Useful New Books & Government Publications

1953-54 Economic Facts

ECONOMIC ALMANAC 1953-1954. *Edited by Frederick W. Jones. Published by National Industrial Conference Board, Inc., 247 Park Ave., New York 17. 1953. 752 pages. 5½x8 in., cloth. Price:* $3.95.

Based on National Industrial Conference Board research and many other sources, the Almanac offers a compact and convenient guide to statistics of interest to industrial executives. This 12th edition of the Almanac contains an impressive total of 812 tables, dealing with such varied topics as resources, agriculture, electricity and gas, construction, trade, statistics of individual industries and public finance.

The book is completely indexed and contains a glossary of selected terms.

Research in Biochemistry

BIOCHEMICAL PREPARATIONS. *Vol. III. Edited by E. E. Snell. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. 1953. 128 pages. 6x8¾ in., cloth. Price:* $3.50.

Offering accurate and detailed methods for the preparation of twenty-four compounds used in biochemical research, this book is the third in a series prepared by a group of prominent biochemists.

Information on each of the preparations includes principle, starting material, procedure, properties and purity of product, and methods of preparation. Book is completely indexed and illustrated.

The Technology of Fruit And Vegetable Juices

FRUIT AND VEGETABLE JUICE PRODUCTION. *By Donald K. Tressler and Maynard A. Joslyn. Published by Avi Publishing Co., Inc., 31 Union Square, New York 3. 1954. 962 pages. 5½x8 in., cloth. Price:* $15.

Written with the collaboration of twenty prominent food research specialists, this work covers the remarkable progress of the fruit and vegetable juice industry in the United States. Advances in the technology of preparation, preservation, concentration, and utilization of juices have make considerable revision of the original edition of this book necessary.

The greatest advance, frozen juice concentrates, is discussed with detail, though none of the industry's products or processes are neglected. Aimed primarily at members of the juice industry, the book is also of great interest to canners, freezers, and dehydrators of fruit and vegetable products. The chapters on utilization and disposal of waste will be of particular interest to the latter.

The book contains a store of useful data on juices now in experimental stages as well as those already in commercial production. Noteworthy is the thorough bibliography contained in the volume. Book is indexed and illustrated.

Fat Processing Survey

CONTINUOUS PROCESSING OF FATS. *By M. K. Schwitzer. Published by Leonard Hill Ltd., Stratford House, Eden St., London N.W.1. 1952, 354 pages. 5⅝ x 8¾ in., cloth. Price:* $6.25.

The application of continuous production methods to vegetable oil extraction and other oil and fats industries is described in this comprehensive work. The institution of new chemical engineering principles in the war against waste is reforming the entire scope of these industries. Mr. Schwitzer's book covers not only the processing angles of the changes, but the economic advantages as well.

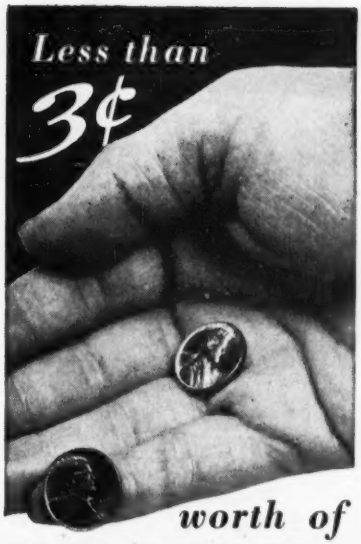
As an example, margarine is being packed at the rate of 90 packets per minute, as an immediate result of processing innovations that increased efficiency of oil extractors from 65 to 98 percent. This is only one of the many examples of what continuous processing methods have done for the oil and fats industry.

Directed at the plant man, the book contains many practical operating hints, and covers every process from production of the oil to manufacture of food products. Book is indexed and illustrated.

Government Publications

TASTE TESTS ON CANNED ORANGE JUICES. *Bureau of Agricultural Economics, USDA,* 20 pages. Reports tests on consumer preferences for various sweet and sour ratios; cooperative project with two Florida organizations.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.



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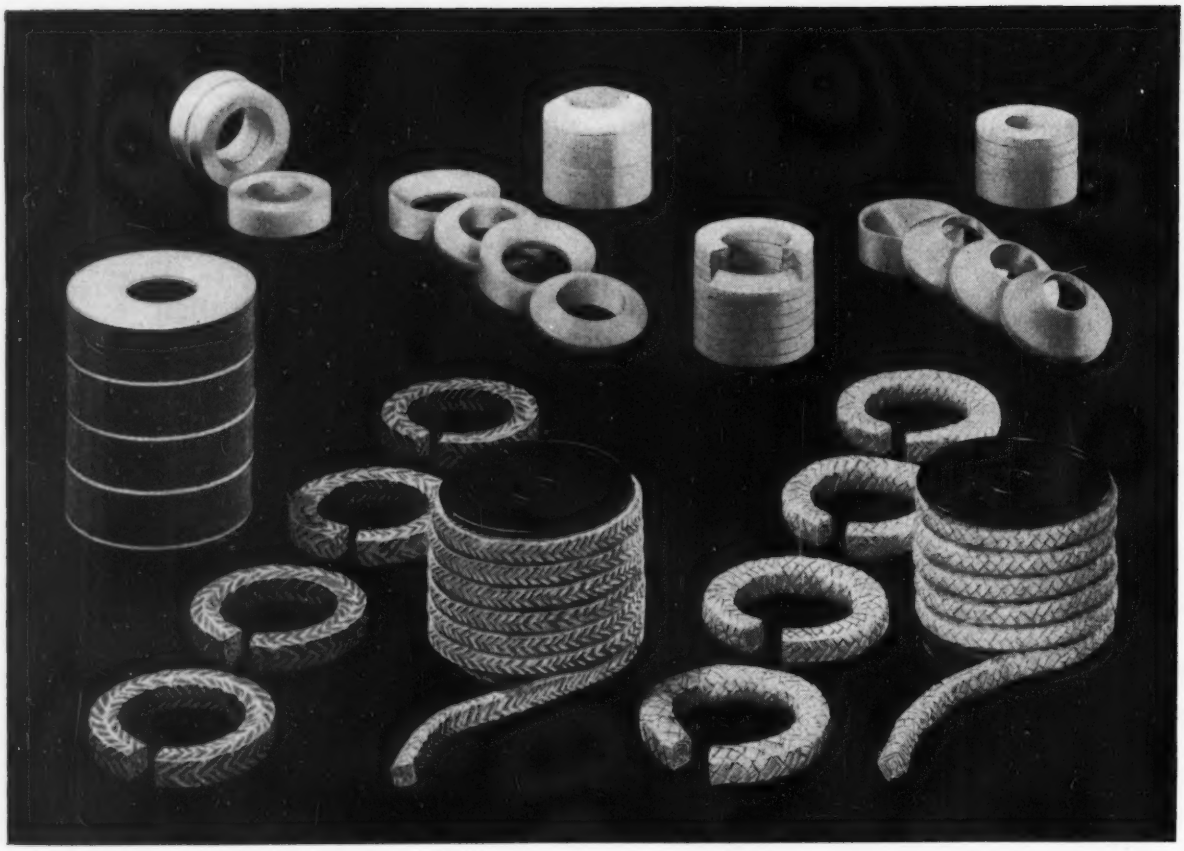

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R/M Teflon makes a particularly ideal packing material for food processing equipment because it is non-adhesive and non-contaminating. In addition, it shows no reaction against any chemicals which might be used in food processing. It is unaffected by any known industrial acids and caustics; it has no known solvent; its water absorption is zero; and weather does not affect it.

No matter what you are packing — pumps, valves, retorts, hydraulic presses, homogenizers, or what have you — R/M can supply you with the proper packing for the job. R/M No. 845, lower right in the photo above, typifies the quality of the line. This packing, made by braiding pure Teflon tape, is fabricated to permit flexibility under expansion and is recommended as a superior packing for general valve stem applications. Its ability to resist the action of corrosive liquids, acids and chemicals eliminates the need for three different types of packings.

The complete R/M Teflon products line includes rods, sheets, tubes, tape, packings, gaskets, rings, and irregular shapes. For complete information, see your R/M distributor.

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

'Keep Mellorine Separate'

California's law prohibiting making or selling imitation ice cream and real ice cream at the same place of business has been upheld by the Sacramento County Superior Court.

The court issued an injunction restraining Irv Blake from making, selling, or storing ice cream at his establishment so long as he handles imitation ice cream there. Blake brought suit against the State Department of Agriculture, attacking the law. But the court's ruling favored the Department on the cross complaint this agency filed against Blake.

Re-Endorse Nutrient Use

The public has benefitted through sound practices in adding nutrients to specific foods, according to a joint statement just issued by the Food & Nutrition Board (National Research Council) and the Council on Foods & Nutrition (American Medical Assn.).

Policies were reconsidered to check experience over the years. Specifically reaffirmed, however, was need for (1) clear indication of probable advantage in adding nutrients, (2) assurance food item is effective vehicle, and (3) evidence that addition does not adversely affect diet in other respects.

Soya Milk for Indonesia

Due to an acute shortage of cows' milk in Indonesia, work has been launched on a factory in Jokjokarta to make milk from soyabeans.

To cost approximately $400,000, the plant is being financed jointly by the U. N. International Children's Emergency Fund, the Ministry of Health, and the Indonesian State Industrial Bank. Completion is scheduled by September.—*McGraw-Hill World News.*

New Sweet "Spud"

More attractive and tasty and high in carotene are plus-features of the new canning-type sweet potato, "Sunnyside", specially bred by USDA researchers at Beltsville, Md.

Tests reveal that it bakes well and retains its quality after vacuum or syrup packing. It is expected to replace the Maryland Golden, which cracks badly during canning.

'Quantitative Safe Limit' Looms Large As Concept in New F&D Legislation

A phrase you'll be hearing a lot about in discussions of Food & Drug legislation during the current session of Congress is—"Quantitative safe limit."

Particularly, the phrase will have a strong bearing on legislation concerned with chemical food additives.

Existing bills on the subject labelled "Controversial" (FE, Dec. '53, p. 195) stand little likelihood of legislative action this year. But chances look good that the concept will provide a common ground on which groups in the food and chemical industries can compromise present differences.

The details haven't been worked out, but in general, this is the recommendation to be embodied in a new bill slated for introduction by Rep. Joseph O'Hara of Minnesota: the Food & Drug Administration should determine a quantitative safe limit for the use of any food additive. Materials on which such limits have been established would then be taken out of possible coverage under sections 402 (a) and 406 of the Food, Drug & Cosmetic Act. These sections define adulteration and tolerances.

Too, there is a move to define more clearly FDA's discretionary powers over additives. Some industry sources have felt that the agency has arbitrarily based some decisions not on safety but on necessity of use, a matter they hold is more in the province of the consumer.

This quantitative safe limit concept also has a supporter in Charles Wesley Dunn, general counsel for the Grocery Manufacturers Assn., and dean of lawyers in the food, drug and cosmetic fields. He feels this formula is the right approach to law amendment.

Finding this "middle ground" appreciably increases the chances for congressional approval. But with the multiplicity of larger issues now being debated on Capitol Hill, it's doubtful whether the overall subject of food law amendment has a high enough priority.

Green Light for Pesticide Bill

A satisfactory compromise of procedures to bring control of amount of pesticides remaining in foods into line between Government and chemical industry views is represented in the new bill (HR 7125) introduced Jan. 11 by

FSU'ers Learn Commercial Cake-Making "How-To"

Same high quality cake as one being prepared here by Demonstrator Ray Thelen, of Pillsbury Mills, must be turned out by students of Baking Science & Management at Florida State University, Tallahassee.

A bachelor's degree is offered by department, which will graduate its first class in 1955. Southern Bakers Assn. cooperated in the department's establishment and has further provided a number of scholarships. Courses include such subjects as principles of commercial baking, bakery management, and business administration. And the curricula are specifically shaped as training leading to posts of bakery production superintendent, bakery sales manager, baking science technologist, and general administrator.

Students work with a line of modern equipment that turns out bread and various other baked products for use in campus dining halls.

Cites America's Zoom in Eating Since 1939

4,000 More Items . . . 50% More Income to Food . . . Ready-Serves Save 4 Hr. Daily . . . Breakdown on Specific Products

Radical changes for the better in America's eating habits since prewar days are emphasized in new pointed comparisons made by Paul S. Willis, president, Grocery Manufacturers of America.

With some 5,000 food and grocery items now competing for her favor in the supermarket—as against only about 1,000 in '39—the homemaker today spends some 27% of disposable income per person for food and food service. This is a 50% up from the 18% of '39. New quantity, quality, and convenience of foods are cited, along with higher average income.

Compared with prewar, per-person consumption is running: 1,250% more frozen vegetables, 900% more baby foods, 738% more frozen fruit and fruit juices, 218% more canned fruit juices, 80% more canned soup, 71% more ice cream, 40% more cheese, 40% more canned vegetables, 35% more canned fruit, 37% more beef, 13% more coffee, 7% more fluid milk and cream, and 6% more condensed and evaporated milk.

The sharp trend to convenience foods has been stimulated by the great saving in time for the homemaker. On this score, a check by the USDA Bureau of Human Nutrition & Home Economics is significant: Researchers made test meals with food in three forms—(1) with as little advanced preparation as the market affords, (2) with food partially prepared, and (3) with food of the ready-to-serve type. And they found that traditional food preparation, watching, serving, and cleanup time for a family of four for one day required 5.5 hr. But ready-to-serve foods needed only 1.6 hr.

Here is GMA's per capita run-down on consumption of specific foods, '54 vs. '39:

Fresh meat—20% more, but 150% more canned meat.

Fluid milk—7% more, but 100% more non-fat dry milk and 100% more cottage cheese.

Margarine—Up 190%.

Lard & Shortening—About same, but 33% above other edible fats and oils, such as salad oils.

Fresh oranges & grapefruit—About 20% fewer, but 1,500% more canned orange juice, 15% more straight and blended canned grapefruit juice, 40% more citrus segments. Frozen citrus concentrate (debut about '46) has zoomed about 50 times, or 5,000%.

Fresh apples—Some 35% fewer, but 133% more canned and as sauce.

Fresh peas—About 75% fewer, but 5% more canned, 500% more frozen.

Fresh tomatoes—About same. However, nearly 100% more canned juice, and nearly 300% more paste and sauce.

White and whole wheat flour—Some 15% less, but 33% more semolina flour and products.

Potatoes—15-20% fewer whites. And about 70% fewer sweets, but 600% more canned sweets.

Dried prunes—30% fewer, but nearly 1,200% more canned juice.

Fresh strawberries—About 50% fewer, but some 200% more frozen.

Lettuce—40% up.

Avocados—100% up.

Canned pickles—70% up.

Canned fruit cocktail and fruit for salads—100% up.

A. L. Miller (R., Neb.) Accordingly, favorable action is expected.

Like last year's Miller bill (HR 4277) that died in committee, the new measure would set quantitative limits on pesticide residues left in foods. But the routine is revised.

Maker of a pesticide would petition FDA, calling for a setting of a tolerance and offering supporting data. Sought here would be FDA's certification of the usefulness of the specific chemical along with confirmation of amount of residue.

Ninety days would be allotted FDA to set the tolerance. But in that period, either the manufacturer or the agency could, where thought necessary, submit the matter to an advisory committee of experts named by the Secretary of Health, Education & Welfare from a list provided by the National Academy of Sciences. This committee would then advise the Secretary.

In addition, a public hearing could also be requested by any party that considered itself adversely affected by the tolerance. And the decision resulting from the hearing would be open to court review in conventional statute manner. This last was a point sought by FDA, since the former Miller bill was judged as giving no weight to the agency's record of findings in subsequent court procedures.

Further promoting FDA acceptance is the fact that agricultural raw commodities having excessive residues would also be barred from interstate commerce by the new bill. The agency had held that the old bill, limiting its wording to "food," did not work strongly enough against the pesticides.

Getting Low-Down on Non-Stop Buttermaking

To familiarize operators with equipment and methods employed in continuous buttermaking, Cherry-Burrell Corp., Chicago, set up its "Gold'n Flow" school combining classroom work and actual practice in three different plants. Shown is first class, comprised of two C-B specialists and 8 students, seen inspecting Vacreator (rear) and special cream separator (foreground) at Wapsie Valley Creamery, Cedar Rapids, Iowa.

Study of African Fats, Oils

To obtain first-hand information on fats and oils that compete with U. S. products in world markets, USDA is sending a commodity specialist to Africa.

He will study transportation facilities and costs; marketing facilities and methods; practices in grading, storing, and processing; government programs

and policies relating to fats and oils; developments in crop production, culture, and harvesting; and also other factors that may affect the African supply for domestic consumption and export.

Pest Settles 'Permanently'

Failure, seven years ago, of California grain dealers to identify an insect in their storage warehouses as the destructive Khapra and report its presence has resulted in this beetle becoming a permanent pest in the state.

When the beetle, *Trogoderma granarium*, was found in warehouses in Tulare county last November, entomologists hoped it was a recent import that could be completely exterminated. A survey showed, however, that the beetle had been an undetected resident since 1946 because grain dealers confused it with other pests.

Hors d'Oeuvres

▶ Milk production is on the up again, and dairy farmers are advised to consider other farm enterprises or off-farm employment. Should get a plush job driving a milk truck.

▶ According to an Assyrian tablet of 2000 BC, beer was taken aboard Noah's Ark. But not in carry-home cartons.

▶ In Indonesia, cloves are used to flavor cigarettes. A treat instead of a treatment!

▶ What with the current smoking scare, candy cigarette manufacturers have a golden opportunity. They should go on TV with this: "Break the hot cigarette habit! Smoke caramels!"

▶ An ancient Mespotamian tablet reveals brewing to have been a highly rated profession 4,000 years ago, and women were the master brewers of that day.—Many women still are master brewers, when it comes to trouble.

▶ Dr. Garnett Cheney, Stanford School of Medicine, recently found that concentrated cabbage juice heals peptic ulcers. Now you needn't worry about being worried.

▶ Someone put nylon corks in champagne bottles, and the French are up in arms. Seems the new corks don't pop when pulled. Such is the life of a packaging engineer!

▶ Development of licorice began 40 centuries ago, when the stuff was believed to impart youthful vigor to aging men.—The original black magic!

▶ Consumers no longer object to cash-and-carry retail grocery sales. It's no burden to carry what you get for your cash.

STEEL

Every Kind
Immediate Shipment

Plates, Structurals, Bars, Sheets, Tubes, etc. . . . Carbon, Alloy and Stainless Steels . . . .

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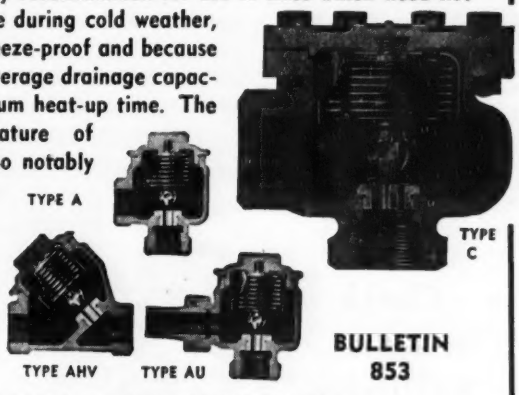
NICHOLSON MAKES
Freeze-Proof Steam Traps
for every Plant Use

Because they drain completely when cold, these four types of Nicholson steam traps are positively freeze-proof. Can be freely installed outdoors. Universally recommended for use in lines which need not be in continuous use during cold weather, because they are freeze-proof and because their 2 to 6 times average drainage capacity results in minimum heat-up time. The non-air-binding feature of Nicholson traps also notably facilitates heat transfer in severe weather. Types for every plant use. Sizes ¼" to 2"; pressures to 250 lbs.



BULLETIN 853

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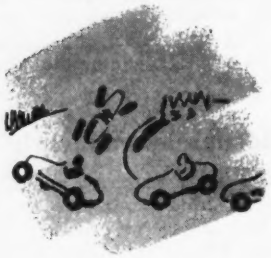
AERATION AGITATION SLIPPAGE RECIRCULATION

for Swimmers...

for Boxers...

for Skiers...



for Auto Racers...

but POSITIVE DISPLACEMENT for *Food Pumping*

Waukesha P. D. PUMP

● High "Buzz-Saw" speed is not essential to overcome high pressure in food pumping. The higher the speed, in fact, the greater the turbulence created, with resultant churning, agitation and aeration of your product. That is why the slow-speed Positive Displacement principle of Waukesha Sanitary Pumps is best protection for your product. Through its gentle action, large open chambers, positive twin blade impeller action, there's no chance of product damage or waste.

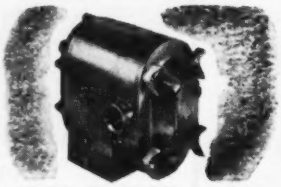
For dependable transmission of your product through high heads, regardless of its viscosity, use Waukesha Pumps. They provide best protection — the most important part of your entire product processing operation. Write for details on the use of Waukesha Slow Speed Sanitary Pumps for this purpose in your plant.

Waukesha 100% SANITARY PUMPS
Dependable Product of a Responsible Manufacturer

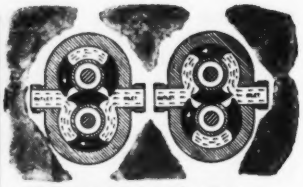
1354 Lincoln Ave., Waukesha, Wisconsin

Check these Exclusive features:

FASTER CLEANING — Streamlined design, eliminating all dirt-catching crevices inside and outside — plus simple disassembly — saves clean-up time and labor.



LONGER SERVICE-LIFE — Fewer working parts, plus Waukesha's One-Piece O-Ring Sanitary Seal, and Standard Reconditioning Plan, mean longer trouble-free service.



CORROSION-RESISTANT METAL — all product contact parts are of Sanitary "Waukesha Metal" or Stainless Steel. Easy to clean, leaves no metallic flavor in syrup or beverages.

WAUKESHA FOUNDRY COMPANY • WAUKESHA, WISCONSIN

Color Decertification Encounters Hurdle

There was no real debate during the one-day FDA hearing (Jan. 19) on decertification of three colors—F&DC Red 32, Orange 1, and Orange 2—in foods (FE Dec., p. 198). Pharmacological evidence provided by FDA showed there was a question of their safety for such uses.

A by-issue developed, however, that caused postponement of the decertification. The question was: Can FDA merely switch the three dyes from the FD&C to the D&C list alone? Or must it first decertify them as FD&C colors and then hold hearings to recertify them as drug and cosmetic colors?

The Toilet Goods Assn. was vociferous in protesting this second procedure. Unless FDA and interested industry representatives can assure each other that the switching would be legal there is a good chance the courts may be asked to rule on the decertification.

FDA has set Mar. 1 as the deadline for submitting briefs on the subject. Decision isn't expected for some weeks thereafter.

Color-Gaging Techniques Weighed in Symposium

Various technical aspects of the problem of gaging and interpreting color and color changes in food were explored in the recent two-day Symposium on Color in Foods, held at the University of Chicago under sponsorship of the QM Food & Container Institute and the National Research Council's Committee on Foods. Highlights:

Abridged methods of evaluating the important quality factors of color and color changes in food products were noted by B. A. Brice, of USDA's Eastern Regional Research Laboratory. Such methods, he pointed out, include use of a filter photometer equipped with one or more filters, and a spectrophotometer limited to measurement of reflectance or transmittance at one of two wavelengths.

For example, color changes in certain food products can be followed, during processing or storage, in terms of reflectance at one wavelength or a ratio of reflectances at two wavelengths.

Research on darkening, during storage, of pureed fruits and vegetables and preserved-fruit products was recounted by G. E. Livingston and C. R. Fellers, of the University of Massachusetts. Two types were specifically observed: Oxidative storage discoloration in the area of the food contacting

Depend On Morningstar For Food Starches And Thickening Agents

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MORE and more Food Product Processors are depending upon us for Food Starches and Thickening Agents. Direct importers and manufacturers, we can ship quickly and economically in any quantities from a few 100 pound paper bags to many carloads. MORNINGSTAR Products are scientifically prepared and laboratory controlled to precise standards of *uniform* fine quality. They'll add new appeal to many foods. MORNINGSTAR, NICOL, INC., 640 West 51st Street, New York 19, New York; 1780 Canalport Avenue, Chicago 16, Illinois.

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New, revolutionary loading platform automatically carries loads from loading dock to truck floor, whether truck is above or below dock. Can also be installed at ground level. Motion controlled by switch bar in platform and by self-leveling ramp. Human element eliminated! No hand switches! Exact levels! Models 6000 to 20,000 lbs. Write for descriptive literature.

FIELD ENGINEERING CO., 66 Foote Ave., Jamestown, N.Y.

Canners Streamline Tomato Processing

• The use of two types of Cyclone Conveyor Belts—Flat Wire and Spiral Woven—saves time, money and labor for large tomato processors. Vegetables are carried on one hydraulic conveyor to a wire mesh grading belt, which culls out small tomatoes for puree production. Others are diverted for further sorting on a Spiral Woven Belt with a smooth, even surface. The graded tomatoes are then carried through coring and blanching operations on two Stainless Steel Woven Wire Belts, 36 inches wide and 150 feet between centers.

Before you plan any revision or modernization of your plant operations, be sure to get complete information on Cyclone Conveyor Belts. Call on our experienced engineers and write Dept. H-24 for a free copy of Catalog #4.

U·S·S CYCLONE METAL CONVEYOR BELTS

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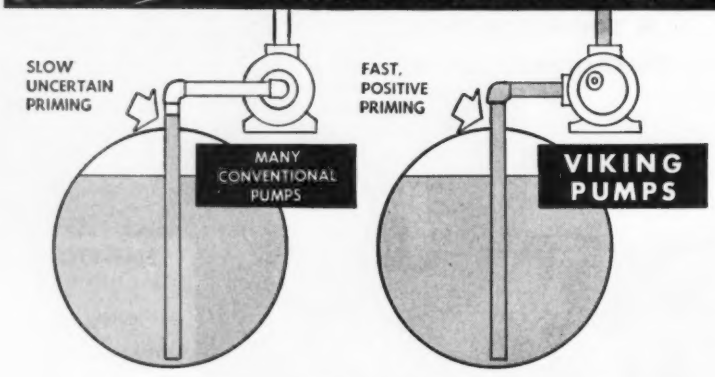

It's the fast start and smooth, even flow that gets your pumping job done quicker and at less cost.

No slow, uncertain priming with Viking positive suction pumps. They prime themselves and go to work at once.

They also save on wear of valves and meters. No sudden jar and spasmodic delivery.

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Investigate the smooth, even flow of Vikings today. To start, ask for bulletin 54SE.

See Our Catalog In SWEETS

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

the headspace gas, and the slower, non-oxidative, diffused darkening.

In studying the mechanisms of these darkenings, it was noted that in foods containing carotenoid or chlorophyllaceous pigments, relatively little change in pigment fraction occurred. The darkening appeared to be due to a browning of the plant tissue itself.

It was indicated that in the absence of solid plant tissue, the darkening occurring in such products as strawberry jam appears to involve the supposedly colorless constituents—*i.e.* sugar, acid, and pectin.

Color measurements of strawberry preserves was dealt with by E. Everett Meschter, of The American Preserve Co., Philadelphia, and R. Winston Liggett, Toelle Laboratories, Newton, N. J.

Accenting convenience of objective measurement that is capable of recording visual stimuli for future comparison, these researchers cited studies that utilized spectrophotometric measurement of a 1 mm. light path through the original undiluted preserve at three specific wavelengths. The subsequent calculations from these three readings develops a value of red pigment, P, and of browning, B. The absolute, as well as relative value of P and B gives a reliable objective measurement of acceptability of the preserve.

Reuben Pomerantz, Capt., QMC, and with the QM Institute, told of evaluations made of the performance of American Optical Co.'s new rapid-scanning spectrophotometer. Preliminary checks revealed, he said, that this instrument can be used successfully for food color-quality control work.

Further, S. G. Younkin, Campbell Soup Co., Camden, N. J., described application of the color difference meter to a tomato color measurement problem. Studies with unit indicated that tomato puree color can be accurately described only in terms of three color dimensions. He said that suitable chromaticity diagrams have been developed for use with the L, ^{a}L and ^{b}L color dimensions.

Robot Bacteria Counter

Pertinent use in commercial food applications is envisioned for a new device capable of counting microscopic particles such as bacteria cultures or grains of photographic emulsions.

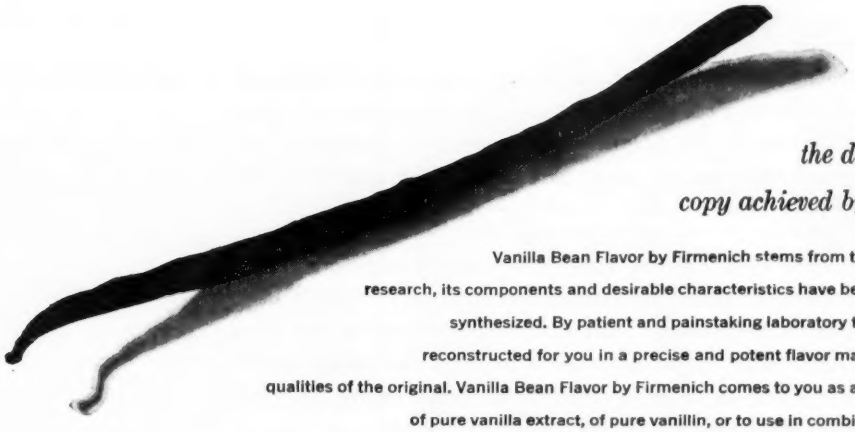
Named the Sanguinometer, the unit was developed by a Radio Corp. of America research team working with the Sloan Kettering Institute. It was devised primarily to provide a swift, simple method of taking blood counts in time of an atomic attack.

Unit combines a TV "eye" with a

CONTAINS NO COUMARIN

STRONGER THAN VANILLIN

imitation vanilla bean flavor by Firmenich



the direct and authentic
copy achieved by original research

Vanilla Bean Flavor by Firmenich stems from the vanilla bean. By original research, its components and desirable characteristics have been isolated, identified, and synthesized. By patient and painstaking laboratory techniques, they have been reconstructed for you in a precise and potent flavor material with all the aromatic qualities of the original. Vanilla Bean Flavor by Firmenich comes to you as an economical replacement of pure vanilla extract, of pure vanillin, or to use in combination, in the manufacture of all products that you flavor with this most popular of flavors.

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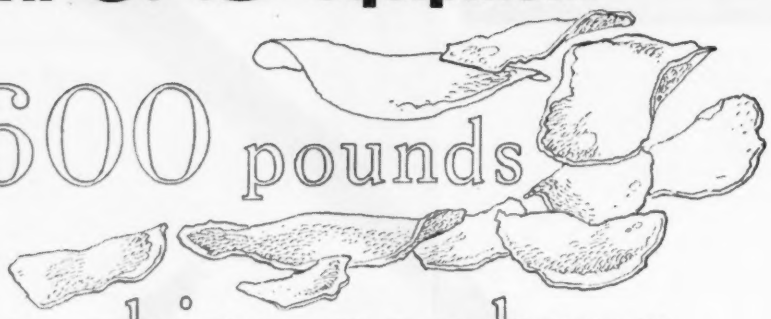
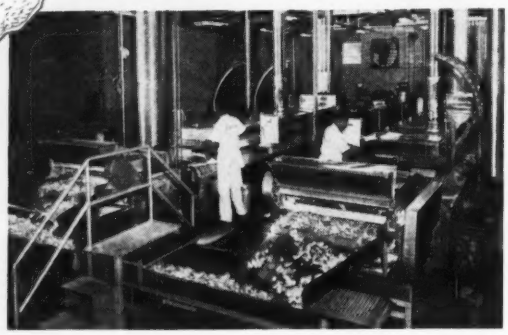
modern GAS equipment



fries 600 pounds of potato chips per hour

at Morton Foods plant, DALLAS, TEXAS



At Morton Foods' new plant in Dallas, the most modern GAS equipment available is used for the manufacture of potato chips. The modern GAS machine and its storage tank contain 3500 pounds of cottonseed oil, which Gas-fired tubes, immersed in the oil, heat to 350° F. Each tank in the processing machine contains five heating tubes, which are controlled automatically, shutting GAS off whenever flue motor stops.

Temperature of the cooking pan bottom is so controlled that it is never overheated. This prevents carmelization of chips which fall onto it. An automatic filter permits filtering of hot oil through the storage tank, and immediate return to the cooking vats, and simplifies evening clean-up.

This Modern GAS Volume Food Processing Equipment, made by MacBeth Engineering Corporation of Harrisburg, Pa., is typical in its performance of the service you can expect from GAS. Gas is clean, Gas is versatile in application. Temperatures are controllable exactly for critical food processing. Get the facts from your Gas Company Representative.

MORE AND MORE... THE TREND IS TO GAS

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK

microscope and a computer for counting particles in a given field.

Scanning the specimen through the microscope, the "eye" tube then sends video pulses as the beam strikes the microscope's images of the particles to be counted. The pulses, in turn, actuate the electronic counter.

Hail 12 Food Companies For Good Management

Special recognition for excellence of management performance in 1953 has been won by twelve companies in the food field. The awards are made annually by the American Institute of Management, New York City.

Nine companies of the twelve were honored for the fourth consecutive year: Beatrice Foods Co., Chicago; Corn Products Refining Co., New York City; General Foods Corp., New York City; General Mills, Inc., Minneapolis; The Great Western Sugar Co., Denver; National Dairy Products Corp., New York City; Pennsylvania Salt Mfg. Co., Philadelphia; The Procter & Gamble Co., Cincinnati; and The Quaker Oats Co., Chicago.

Three other food firms received the award for the third time: The Borden Co., New York City; Kellogg Co., Battle Creek, Mich.; and Swift & Company, Chicago.

Of some 3,000 leading U.S. and Canada concerns studied throughout various industries, only 348 were judged eligible to be certified.

Companies are scored on ten key factors: Economic function, corporate structure, health of earnings growth, fairness to stockholders, directorate analysis, research & development, fiscal policies, production efficiency, sales vigor, and executive evaluation.

Soluble Coffee in Candy

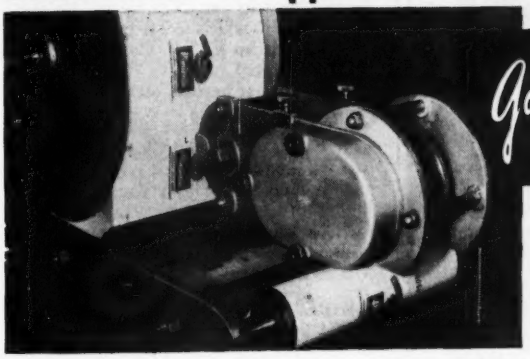
Possible uses of soluble coffee as a pure flavor for confections was pointed out by H. B. King, Holiday Brands, Inc., Walpole, Mass., at the recent meeting of the American Assn. of Candy Technologists, in New York City.

Advantages of using the soluble are low cost, ease in use, low moisture content, excellent keeping quality.

Candies that could be so flavored include centers, caramels, gum jellies, fudge, marshmallow, nougats, cordials, brittles, crunches, also 5c. and 10c. bars. Chocolate coatings can also be coffee-flavored to give them a mocha flavor.

Recommended amounts: 12-20 oz. of soluble coffee for 100 lb. of cream center, or 2-3½ lb. per 100 lb. of hard candies.

Printing Attachment for Wrapping Machine Code-Dates Wrappers Automatically



- Solves coding problems
- Saves manual labor

Prints on cellophane, plastic films, foil, glassine, paper, etc.

This compact, precision-engineered flexographic printing unit attaches readily to any wrapping machine and prints code-dates or other changeable legends on all kinds of packaging materials as part of the wrapping operation. The ROLAPRINTER produces sharp, uniform, permanent impressions at speeds to 500 fpm . . . uses instant-drying inks of any color and interchangeable rubber type . . . requires no attention during operation . . . may also be used on sealers, winders, conveyors, etc. Designed for easy clean-up, 1-minute changeover for new code-date.

Write for ROLAPRINTER literature today.

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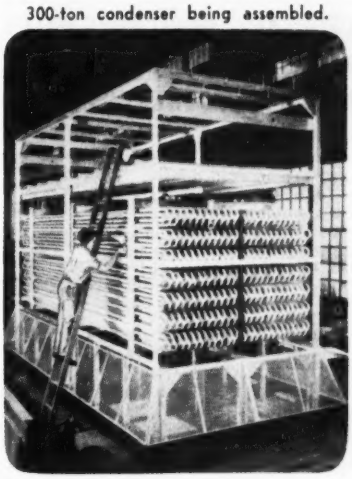
ADOLPH GOTTSCHO, INC.

Machines to Mark Whatever You Make

Hillside 5, N. J.

50 Years of Leadership

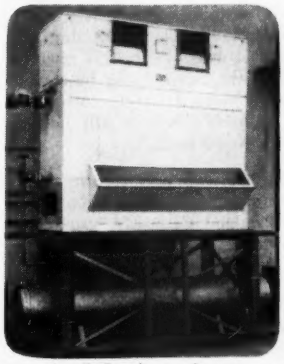
300-ton condenser being assembled.



FRICK

Evaporative Condensers Save Water and Power!

Whether you operate an air conditioning system, a processing plant, or a hotel . . . if you use refrigeration, you can save 95% of the cooling water . . . and lots of money . . . with these efficient condensers. They combine a condenser and a cooling tower . . . evaporate 5% of the water instead of throwing all of it away. Built in 12 sizes, for use with either ammonia or Freon. Ask for Bulletin 234 on these superior condensers: write



Small Condenser in use.

DEPENDABLE REFRIGERATION SINCE 1882

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WAYNESBORO, PENNA. U.S.A.

Also Builders of Power Farming and Sawmill Machinery

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"THIS LUBRICANT INCREASED BEARING LIFE FROM 2 WEEKS TO 2 YEARS"

—says THE GLOBE COMPANY

"Animal acids and moisture, most harmful to ball and roller bearings prevails in the entire meat packing industry. With conventional lubricants, some of the bearings in our Roto-Cut machines did not last two weeks. Since using Ball Bearing LUBRIPLATE in machines operating continuously 24 hours a day for over two years, we have not had a single bearing replacement."

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

Briefly . . .

• FROZEN ORANGE concentrate production capacity has been upped 30% at Minute Maid, which sees a notable rise in sales shaping up in '54. Company points to big potential of some 70% of U. S. families not yet regular users of product.

• USSR is seeking varied food-plant equipment, says Russo-British Chamber of Commerce, London. Named are units for grain-milling, sugar-refining, margarine and butter production, dairy handling, and food packing and wrapping machinery, as well as complete box-making equipment.—*McGraw-Hill World News.*

• SARDINE decline in California is accented by news that only 1,743 tons went to canneries during 1953's entire 3-month season. Only a few years ago, catches ran into hundreds of thousands of tons.

• NEW GRAIN STORAGE units in Jordan have taken an igloo form. Of 500-tons capacity each, they're built by spraying concrete over blown-up rubber balloons. Then after hardening, balloons are removed. Cited features are low cost, sturdiness, and protection against vermin and moisture.

• DULSE, a Bay of Fundy seaweed, has been found to be rich in iodine, calcium, iron, copper, zinc, cobalt, nickel, molybdenum, manganese, strontium, titanium, and vanadium. And word now comes that a Montreal firm plans to process the weed for its nutritional elements, suitable in dietary supplements.

• MILK in the amount of 400,000,000 qt. annually is figured to be consumed with some 3 billion yearly servings of cereal. Accordingly, American Dairy Assn. and Cereal Institute have joined forces for promotion of this breakfast combination in the May Milk Festival.

• PASTEURIZATION OF BEER by atomic radiation is now being explored by Reynolds Metals Co. in special studies being conducted in cooperation with University of Michigan. It's foreseen that packaged beer could be conveyed through a radiation machine at rapid rate. Reynolds sees likelihood of use of aluminum in cans, bottle crowns, and barrels employed with such a system.

• RATIONING of food is slated to end this year in Britain, with all restrictions still remaining due to be lifted within the coming span of months. Initially imposed in 1940 as a war measure, the limitations had to be continued in the period of economic recovery. Britain still imports more than half her food.

• VITAMIN A in huge quantities is going to be imported by India from U. S. and/or Switzerland to enrich "vanaspati," native vegetable cooking oil. Aim is to bring oil up to a nutritional par.

• FILBERTS. Pilot-plant research aimed at devising an efficient means for removing skins from filberts and also improving blanching processes is being put underway at Oregon State College Agricultural Ex-

ROBO-LIFT

HANDLES FOOD PRODUCTS

GENTLY

NO DIGGING
NO SCOOPING
NO SPILLING
OR
BREAKING

Standard Model A-1070 with 8 cu. ft. hopper. Stainless Steel in contact with product.

- Gentle vibratory motion handles many dry products . . . Drugs, confections, foodstuffs, chemicals, pharmaceuticals, etc.
- Product touches only stainless steel.
- Standard hopper shown is not integral part of conveyor, can be made portable.
- "No-spill" buckets invert to discharge. Angle of discharge variable.
- All parts easily accessible. Entire conveyor can be enclosed if desired.
- Many variations of basic model possible.
- Save labor, time, floorspace.
- Preserve fragile products from damage.
- In use by Beech-Nut, Buitoni, Kellogg, Kraft, Lipton, Post Cereals, Brach, Rockwood, Sharpe and Dohme, Safeway Stores, Lance, Inc., A. & P., Salada Tea Co., Campbell Soup, and many other leaders.

MANY DIFFERENT MODELS

Write for descriptive literature on Robo-Lift Bucket Elevating Conveyor and also the Robo-Lift Tray Elevating Conveyor.

Capacity Range up to 25 cu. ft. per minute.

TYPE EV SPEEDRANGERS are electronically-controlled, Thyraton type, adjustable-speed power drives with a wide range of operating speeds and good speed regulation.

SIZES. ⅛ to 1½ HP with basic speed of 2400 RPM.

SPEED RANGE. Drive speeds are adjustable down to one sixth of the basic speed for continuous duty, 50°C.; down to one twentieth of the basic speed, intermittent duty.

HOW IT WORKS. Single phase AC power is converted by Thyraton type electronic rectifiers to supply a DC variable-speed drive motor. This DC drive motor is of the separately excited type, which inherently has good speed regulation.

STANDARD CHARACTERISTICS are constant torque rating over the full speed range . . . complete control from a compact operator's station . . . infinite steps of speed adjustment . . . smooth starting and good speed regulation.

OPTIONAL FEATURES are jogging, reversing, dynamic braking, wide or special speed ranges and special duty cycles.

New

electronic variable speed drives

TYPE GV SPEEDRANGERS are electronically-controlled, motor-generator type, adjustable-speed power drives with a wide range of operating speeds and good speed regulation.

SIZES. 2 to 10 HP with basic speeds of 2400, 1750 and 1150 RPM.

SPEED RANGE. Drive speeds are adustable down to one sixth of the basic speed for continuous duty, 50°C.; down to one tenth of basic speed intermittent duty.

HOW IT WORKS. Three or two phase AC power is converted by a motor-generator set and by tube type electronic rectifiers to supply a DC variable-speed drive motor. This DC drive motor is of the separately excited type, which inherently has good speed regulation.

OPERATION. The Type GV Speedrangers have the same standard characteristics and optional features as listed above for the Type EV Speedrangers.

MANY TYPES. The DC drive motor for both the Type EV and GV Speedrangers are available with Master Unibrakes, Fluid Drives and any of the five types of Master Gearmotors.

THE MASTER ELECTRIC COMPANY
DAYTON, OHIO

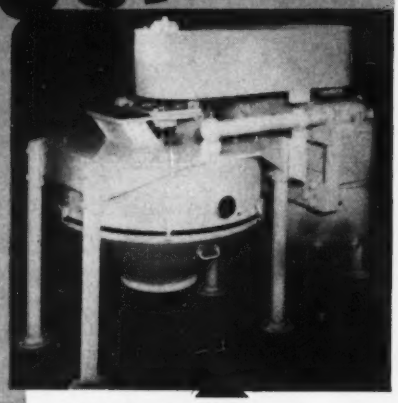
PARTICLE SIZE REDUCTION!

High Productivity Rates per HP expended . . .

Narrow Particle Size Range . . .

Minimum Product Heating . . .

Capacity . . . up to 10,000 pounds per hour or higher on friable materials.



Belt Drive "ENTOLETER" Impact Mill equipped with 25 HP motor.

We shall be glad to process samples of your product on the "ENTOLETER" Impact Mill in our laboratory.

The trademark "ENTOLETER" is your guarantee of complete satisfaction.

ENTOLETER DIVISION
The Safety Car Heating and Lighting Company, Inc.
1149 DIXWELL AVE., NEW HAVEN 4, CONN.

periment Station, employing a grant of funds from the Oregon Filbert Commission. Further project will concern widening use of the nuts, as in cheese spreads, candies, and cake toppings.

• **U. S. CANNERS of fruits and vegetables are invited to look into possibilities of setting up branch plants in Turkey. Information is available from Ekonomi ve Ticaret Vekaleti (Ministry of Economy & Commerce) Ankara, Turkey.**

• FOUR in the average U. S. family—or three? Consumer-field surveyors may be too readily accepting the old four figure. Census some years ago put the family median at 3.23. And now a study of nearly a half million employees in the steel industry appears to confirm the trio as the real average.

Corrections

In the Oct. FE article, "Packaging Machines," rate of ketchup bottling is put at 350 per min. (page 110, last line in first column). This should have read 450 per *min.* Further, the first sentence in the first full paragraph in the second column, same page, should have read: "Two changes, above all others—the vapor-vacuum sealing and gravity-filling techniques—enabled ketchup bottlers to attain this 350% increase in production."

Schedule of Events

February

13–15—Institute of American Poultry Industries, Silver Anniversary Fact-Finding Conference; Kansas City, Mo.
15–16—Cottonseed Processing Clinic; USDA Southern Regional Research Laboratory, New Orleans, La.
17–18—Mexican-Foods Institute, first annual meeting; Roosevelt Hotel, New Orleans.
18–19—Dairy Industries Supply Assn., annual meeting; Shoreham Hotel, Washington, D. C.
21–27—National Wholesale Frozen Food Distributors' Assn., convention-exhibit; New York City.
25–26—Baking Industry Sanitation Standards Committee; Edgewater Beach Hotel, Chicago.
28—Bakery Equipment Manufacturers Assn.; Edgewater Beach Hotel, Chicago.

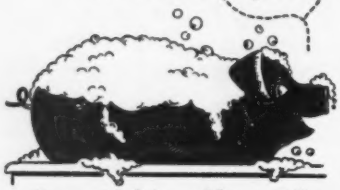
March

1–5—American Bottlers of Carbonated Beverages, plant training course; Hotel Lafayette, Washington, D. C.

April

5–8—National Packaging Exposition; Atlantic City, N. J.
25–29—National Refrigerated Warehouse Assn.; Boca Raton, Fla.
26–28—Pacific Northwest Bakers Conference; Multnomah Hotel, Portland, Ore.
29–30—Pennsylvania Manufacturing Confectioners' Assn., annual production conference; Little Theatre, Franklin & Marshall College, Lancaster, Pa.

Metso cleans all but the squeal



• Start with hog scalding—5 lbs. of Metso Granular — 1000 gals. water. Bristles are easily removed and leave the hide clean and white.

Pork-kill floors are freed of fat and blood—show no water break after Metso cleaning. Other jobs for Metso include ham molds, boilers, hooks, smoke house, lard tanks and trucks.

Let us send you a pound sample of Metso Granular (sodium metasilicate) for comparative tests.

PHILADELPHIA QUARTZ CO.
1148 Public Ledger Bldg.
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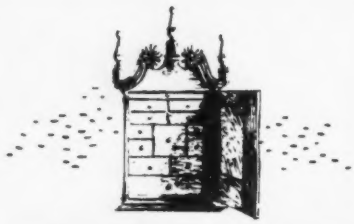
METSO
Metso® cleaners



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Florasynth Labs. (Canada) Ltd. Montreal, Vancouver, Winnipeg
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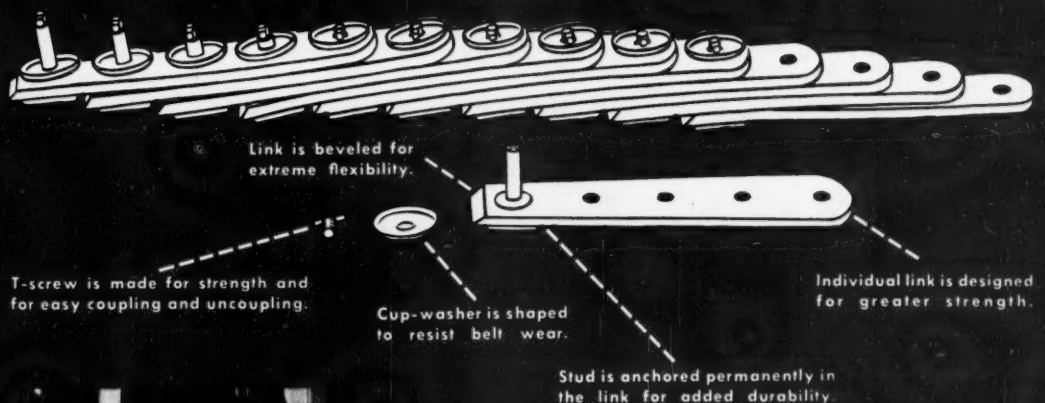
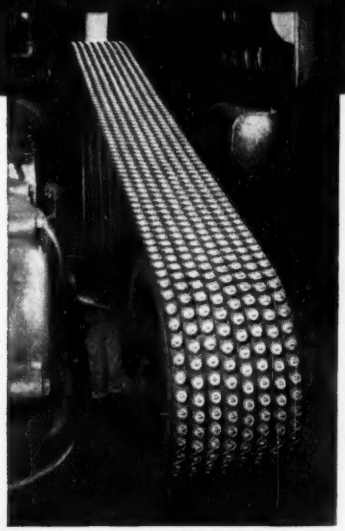
This detailed line drawing of the new, patented Veelos TD and TE v-belt makes it easy to see how this new v-belt is designed to do a better job . . . easier!


Link is beveled for extreme flexibility.
T-screw is made for strength and for easy coupling and uncoupling.
Cup-washer is shaped to resist belt wear.
Stud is anchored permanently in the link for added durability.
Individual link is designed for greater strength.



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TD and TE Adjustable V-belt

So easy to couple *it installs in minutes*

So strong and durable *it lasts for years*

The new Veelos TD and TE adjustable v-belt is the successful development of a specific v-belt designed for a specific service—D and E drives.

This new Veelos TD and TE v-belt has these basic advantages . . .

It simplifies installation. Links are quickly joined by easy-to-use cup-washers and T-screws to make up individual belts. It's the easiest v-belt to couple and uncouple ever developed. And you don't need to waste time removing outboard bearings.

It lasts longer—is more flexible. New high-tensile strength link combined with new stud, cup-washer, and T-screw gives added durability. New link construction provides maximum flexibility for cooler, wear-resistant running.

Get the complete story of this great new v-belt for D and E drives. Send coupon now for new 8-page illustrated catalog.

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ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

For more information, use coupon on page 159.

Recent Inventions

PRODUCTS

Making Caramel Color in Form of Dry Powder by Burning Sugar in Open Kettle to Tinctorial Power 20-50 and Water Content 4–7%, Discharging While Hot, Cooling —*J. E. Cleland, H. W. Curry, St. Louis, Mo., and A. L. Meyer, to Union Starch & Refining Co., Granite City, Ill.* No. 2,651,577. Sept. 8, 1953.

Marine Product by Treating With Free SO_3 Then Driving off Volatiles—*C. B. Stevenson, Wilmington, Calif. to Quaker Oats Co., Chicago,* No. 2,656,275. Oct. 20, 1953.

Hard Butter From Coconut Oil Which Has Been Treated to Free it of Unsaturated Portions of Fatty Acid Radicals—*J. E. Blum, El Cerrito, Calif. to The Glidden Co., Cleveland, Ohio.* No. 2,657,995. Nov. 3, 1953.

Edible Gelatin Composition Containing Adipic Acid and Able to Gel When Dissolved in Water—*L. R. Ferguson, Stamford, Conn. to General Foods Corp., New York.* No. 2,657,996. Nov. 3, 1953.

Stabilized Citrus Oil Containing Butylated Hydroxyanisole—*I. I. Russof, East Orange, and J. L. Common, Rutherford, N. J. to General Foods Corp., New York.* No. 2,657,997. Nov. 3, 1953.

Precooked Legume Soup Base by Comminuting to Small Particles and Dehydrating to Less Than 7 Percent Moisture—*A. C. Rauch, Blue Island, Ill.* No. 2,657,999. Nov. 3, 1953.

Confection Made by Combining Finely Ground Ice With Ingredients for Center, Pressing to Shape, Coating at Below Melting Temperature—*P. E. Schultz, Wichita, Kan.* No. 2,658,830. Nov. 10, 1953.

PROCESSES

Bleaching Shell Eggs By Applying Hydrogen Peroxide Solution and Circulating Vapor Around Shells 12 to 48 hr.—*H. J. Almquist, Modesto, Calif.* No. 2,655,449. Oct. 13, 1953.

Concentrating and Stabilizing Pro-Vitamin A, Vitamin E, Antioxidants From Carrots by Disintegrating, Emulsifying, Pressing, Separating—*F. Tiedt, Otterndorf and R. Dewald, Wiesbaden, Germany.* No. 2,656,274. Oct. 20, 1953.

Concentrating Liquid Food Products by Reducing Temperature in Successive Stages to Form Pure Water Ice Crystals, Moving Partially Frozen Concentrate Counter to Ice, Removing Ice at Most Dilute Concentrating Point, Evaporating Concentrate in Spray Drier—*H. A. Toulmin Jr. to The Commonwealth Engineering Co., Dayton, Ohio*—No. 2,656,276. Oct. 20, 1953.

Dehydrating Liquid of Low Solids Composition by Step-Freezing and Centrifugal Ice Crystal Removal—*E. P. Wenzelberger to The Commonwealth Engineering Co., Dayton, Ohio*—No. 2,657,555. Nov. 3, 1953.

Application of Plastic Materials to Biscuits and Like Products Utilizing Overlaid Stencil-Openings and Moving Belt—*A. Derbyshire and J. F. Naylor to T. & T. Vicars Ltd., Earlestown, Newton-le-Willows, England.* No. 2,657,646. Nov. 3, 1953.

Clarifying and Stabilizing Fermented Beer by Adding Mixture of Irish Moss, Tannic Acid, Salts, and Reducing Agent to Produce a Precipitate—*J. V. MacDonough, Watertown, Mass.* No. 2,658,829. Nov. 3, 1953.

Cheese Made Continuously by Inoculating Starter, Coagulation, Separating Whey by Subdividing, Draining, Pressing, Partially Drying by Heat, Homogenizing, Shaping—*C. Arkin, Cape Town, South Africa.* No. 2,657,993. Nov. 3, 1953.

Making Cheese by Removing Curds in One End of Vat and Forcing it to Slide Onto Platform by Scraper Manipulating—*R. Miollis, Maywood, Ill. to The Borden Co., New York.* No. 2,657,994. Nov. 3, 1953.

EQUIPMENT

Peach Processing Machine Employing Plurality of Grasping Devices to Align Fruit in Correct Suture Plane and Deliver to Remote Cutting Station—*R. L. Ewald, and H. A. Skog, Olympia, Wash., to Special Equipment Co., Portland, Ore.* No. 2,649,880. Aug. 25, 1953.

Sausage Link Forming Machine Employing Pipe-Fed Wheel With Recessed Molding Pockets—*A. H. Burnett, Chicago, and J. J. Prohaska, La Grange, Ill. to Swift & Co., Chicago, Ill.* No. 2,651,808. Sept. 15, 1953.

Apparatus for Recovering Oyster Meats From Shells Employing Drum Mover and High-Pressure

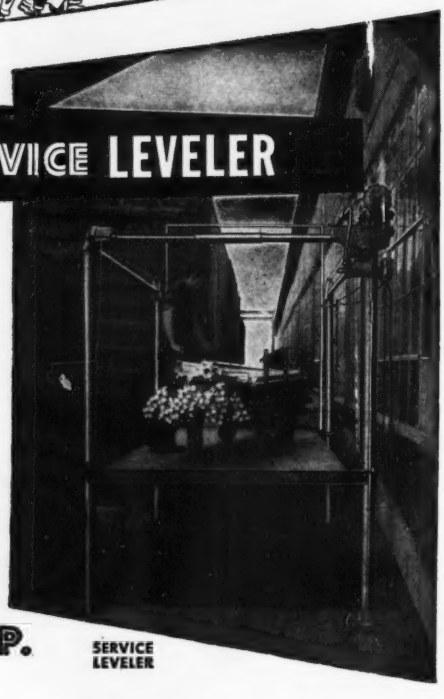
4 MEN ON A RAMP

Replaced by 1 and a SERVICE LEVELER

Here's the Story of Actual Manpower Savings by One Progressive Company

When the Canadian Line Materials Co., of Scarboro, Ontario, used a ramp to reach the level of their loading dock, "it was taking three or four men to shove even the smallest load up the ramp." Now, with the Service LEVELER installation pictured at right, only one man is required to move even capacity loads onto the dock. This saves the wasted time and distraction from other duties of *at least* two men for every heavy shipment made... a substantial, worth-while manpower savings.

Find out how the LEVELER can cut your costs and save strain on men and mobile equipment in loading trucks and cars, lifting to different floor levels, etc. Write for detailed information today.



See Service for Specials Versatile design permits most Service lifting equipment to be made up as low-cost semi-specials to fit your exact needs. We'll be glad to discuss your requirements.

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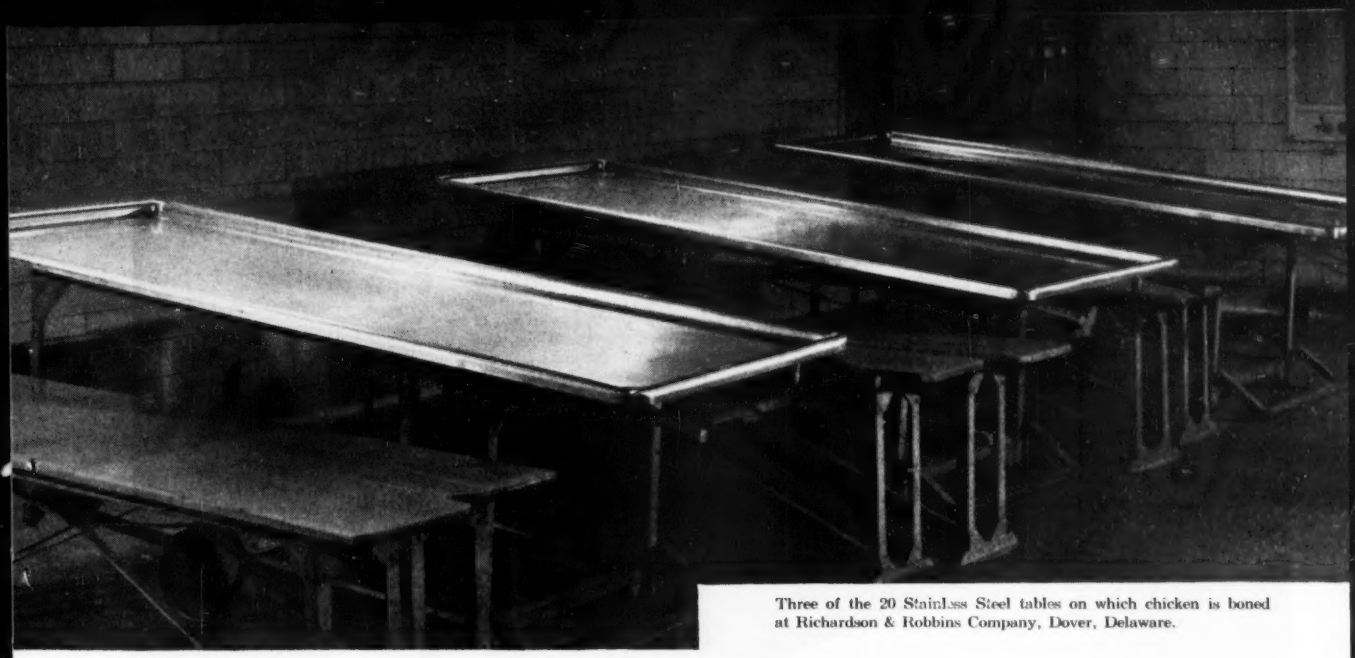
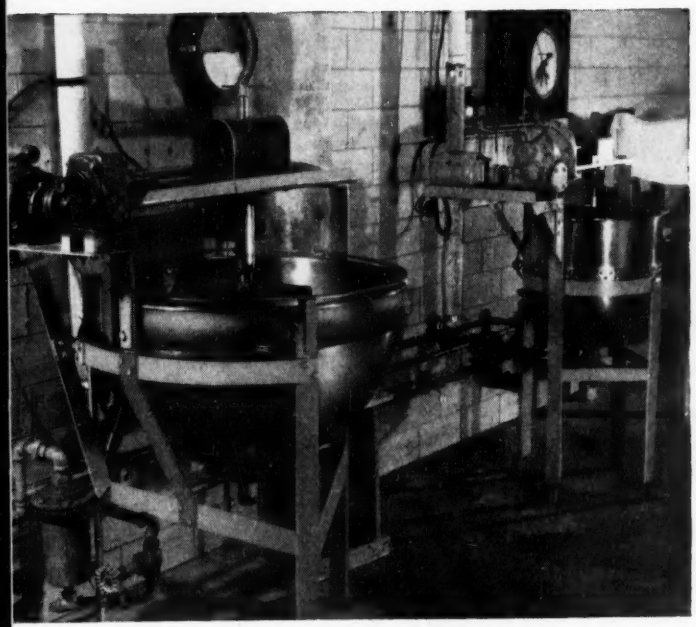


Three of the 20 Stainless Steel tables on which chicken is boned at Richardson & Robbins Company, Dover, Delaware.

To can chicken fricassee...
YOU CAN'T BEAT STAINLESS STEEL



Chicken for chicken fricassee and chicken a la king is prepared and cooked in these Stainless Steel steam-heated kettles.

ESTABLISHED nearly 100 years ago, Richardson & Robbins Company, Dover, Del., has long been a leader in adopting modern canning methods and equipment in packing boned chicken, chicken fricassee and similar products. So it's not surprising to find this company using Stainless Steel.

For example, in cooking chickens in steam-jacketed kettles Stainless Steel baskets are used to make handling easier. After cooking, they are boned on Stainless Steel tables. The company formerly used zinc-covered wooden frames for the boning job, but found them difficult to clean because of seams. The smooth, seamless, Stainless surfaces make cleaning a quick and simple job.

Two Stainless Steel kettles in which chicken fricassee and chicken a la king are cooked have been in service ten years. Their smooth, pit-free surfaces are easy to wash and sterilize.

Stainless offers an unequalled combination of long life and ease of cleaning that makes it almost a "must" in all types of food processing. Make full use of it, and when you do be sure you get perfected, service-tested U·S·S Stainless Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
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U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS USS PIPE · TUBES · WIRE · SPECIAL SECTIONS

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UNITED STATES STEEL

Convey Packages Uphill (or down) on "Super Grip" Fingers

On our screen, we are showing you a close-up view of Super Grip Package Conveyor Belting. Notice the specially moulded fingers that project from the surface of the belt. These fingers literally anchor packages and other bundled material to the belt while being conveyed uphill or down. Yes, even on grades as steep as 30°. Super Grip Package Conveyor Belting, just one item in a complete line of belting, hose and packing, is available at your local Republic Distributor—call him today. If his name is not in the yellow pages of your phone book, write directly to us.

REPUBLIC RUBBER DIVISION

LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN 1 OHIO

INDUSTRIAL RUBBER PRODUCTS

For more information, use coupon on page 159.

Water Jets—*S. G. Harris, Beaufort, S. C. to Blue Channel Corp., Port Royal, S. C.* No. 2,652,588. Sept. 22, 1953.

Machine for Dropping Hog Carcasses From Shackle—*L. R. Spooner, Watertown, S. Dak. to Swift & Co., Chicago, Ill.* No. 2,652,589. Sept. 22, 1953.

Gum Stick Forming Unit Employing Opposed Scoring Rolls, Breaking Rolls and Oscillating Transfer Member—*L. W. Shoppee, Springfield, Mass. to Package Machinery Co., East Longmeadow, Mass.* No. 2,652,788. Sept. 22, 1953.

Endless Belt Candy Molding Machine—*T. L. Peters, A. George, and L. Stidham, Tyler, Texas.* No. 2,652,789. Sept. 22, 1953.

Dough Divider With Curved Wall Dough Box With Longitudinal Plunger of Same Cross Section to Compress Dough Confined in Box—*A. E. Hein and W. H. Klausing, to Century Machine Co., Cincinnati, Ohio.* No. 2,652,790. Sept. 22, 1953.

Bread Loaf Molding, Baking, Depanning and Delivering Apparatus Comprising Pan-Bearing Endless Conveyor and Associated Attachments—*S. Liston, St. Kilda, Melbourne, Victoria, Australia.* No. 2,652,791. Sept. 22, 1953.

Vertical Continuous Cooker With Bottom - Discharged Superposed Heating Chambers With Linked and Rockably Mounted Discharge Valves—*G. R. Greenbank, to French Oil Mill Machinery Co., Piqua, Ohio.* No. 2,653,084. Sept. 22, 1953.

Endless Belt Conveyor With Erected Hinged-Cover Carton Holding Supports and Loading Means—*R. J. Fahey, Evanston, and M. Burger, Morris, Ill. to General Package Corp., Chicago.* No. 2,652,960. Sept. 22, 1953.

Machine for Automatically Applying Cellulose Type Seals to Bottle Tops—*J. L. Pomeroy, Madison, Wis. to Gisholt Machine Co., Madison, Wis.* No. 2,652,963. Sept. 22, 1953.

Cutter for Removing Fillet Portions of Fish From Backbone With Gravity Chuting of Three Components to Conveyors Below —*J. J. Duggan, Wollaston, Mass.* No. 2,654,119. Oct. 6, 1953.

Grain Drier With Flanged Inner Cylinder and Forced Hot Combustion Gas Circulating Between Inner and Outer Cylinders—*L. V. Molenaar, Lake Lillian, Minn.* No. 2,654,590. Oct. 6, 1953.

Grain Malting Apparatus Having Vertical Germinating Columns With Forced Aeration and Temperature Control, Continuous Gravity Flow—*E. E. Frauenheim, Jr., Eggertsville, N. Y.* No. 2,654,691. Oct. 6, 1953.

Dough Sheeting Apparatus for Bakery Machines Employing Positioned Rollers With Supplementary Guides—*D. Whitehead, Oak Park, and J. F. Anetsberger, Northbrook, Ill. to Anetsberger Bros., Inc., Northbrook, Ill.* No 2,655,118. Oct. 13, 1953.

Continuous Pulverized Vegetables Fermenter to Produce Fertilizer Residue Including Proportioning and Manure Integrating System and Anearobic Fermentation Surge Vat—*F. Laurenty, Loos-les-Lille, France.* No. 2,655,434. Oct. 13, 1953.

PACKAGING

Sausage Package With Inner Expansible Liner to Provide Smooth, Rounded Product Surface—*J. B. Ames, Selma, Ala.* No. 2,655,450. Oct. 13, 1953.

Metal Container Inner Coating of Polyhydroxy Alcohol Partial Ester Which Prevents Adherence of Proteinaceous Meaty Materials During Cooking—*A. C. Edgar, Palos Heights, Ill. to Wilson & Co., Chicago.* No. 2,655,451. Oct. 13, 1953.

Belt-Type Unit for Aligning Cans in Single Rows—*E. C. Kraus and M. V. Douthitt, Ortonville, Minn.* No. 2,656,910. Oct. 27, 1953.

Container Handling Mechanism Which Translates Single File Into Procession of Superposed Units at Right Angles to Feed—*J. Boyce, San Jose, and J. C. Olsen, Campbell, Calif. to Food Machinery & Chemical Corp., San Jose.* No. 2,656,911. Oct. 27, 1953.

Ice Cream Bagger Employing Slideable Feed Hopper With Chutes Below—*K. A. Bevington, Evanston, Ill.* No. 2,656,961. Oct. 27, 1953.

Filler With Means for Providing Vacuum Headspace Over Liquid Through Unique Valve Operation —*F. W. Krueger to Food Machinery & Chemical Corp., San Jose, Calif.* No. 2,656,963. Oct. 27, 1953.

Can Filler with Reciprocating Product Contacting Plunger and Moisture Projecting Device to Prevent Adherence of Sticky Material—*M. J. McDonough, and E. B. Burchett, Waukegan, Ill. to American Can Co., New York.* No. 2,656,966. Oct. 27, 1953.

Can Sorter With Visual Indicia Consisting of Plurality of Inclined Conveyor Trackways—*F. M. Johnson and L. I. Bulliet, Rockford, Ill. to Odin Corp., Chicago.* No. 2,657,817. Nov. 3, 1953.

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers for those you want and enclosing 25¢ for each copy.

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ALL SERVICE SEPARATORS

. . . for removal of liquid entrainment (water, oil, etc.) from vapors-gases

Clean, dry vapor-gas (steam, compressed air) is assured at point of use since liquid entrainment is effectively separated by a scientifically designed, impingement type baffle and immediately moved to the separator drain. Separated liquid cannot be wiped or carried over or under baffle to the outlet path. Pressure loss is practically nil since areaways through separator are much greater than cross-sectional area of inlet.

In all sizes ½" to 12" for working pressures up to 600 lbs.

MULTIPORT DRAINERS

. . . for continuous discharge of vapor condensate under vacuum or positive pressures up to 200 psi

Instantaneous response • Tremendous discharge capacity due to large port areas • Only one moving element • Self-regulating, self-cleaning cylindrical valve never leaves seat • Position handle outside body permits manual closing or opening wide to serve as an effective blow-off • Several types in many capacities available.

Write today for full details.

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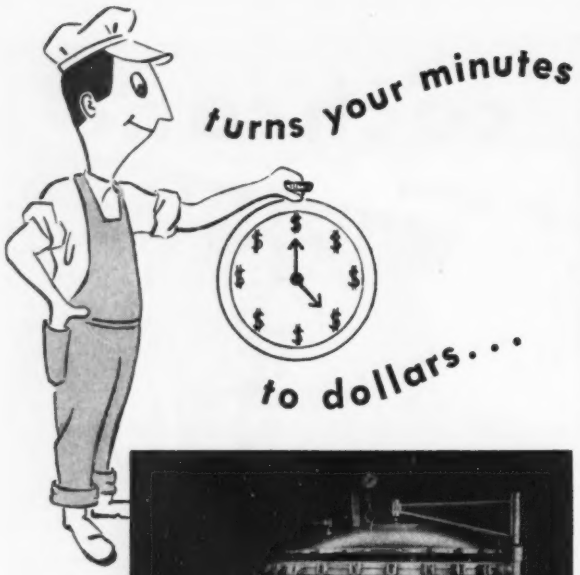
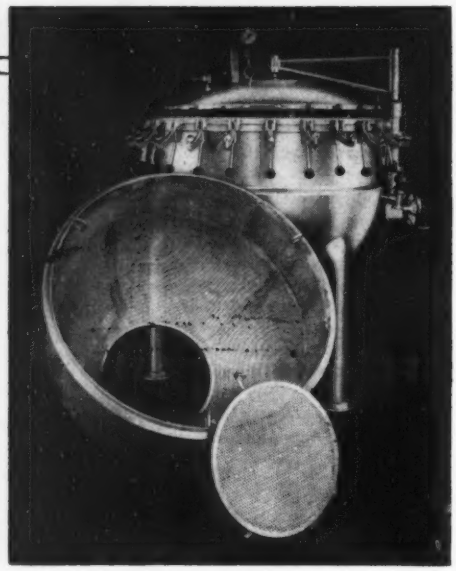




Cut minutes off production time, and you have dollars and cents saved in lower unit costs. The new Hamilton Style PC Pressure Cooker is built for speed to save you those dollars.

For faster heat-up it has a full "super jacket" which heats the entire hemisphere of extra large inner bowl. And the steam jacket is equipped with a new, specially designed steam spreader to give quick-heating efficiency to your cooking process.

In addition to fast processing the Hamilton PC Pressure Cooker also has many sanitary features, including highly polished stainless steel surfaces, tubular legs with smooth and rounded kettle-sockets, and adjustable, vermin-repellent floor flanges.

Available in capacities of 30-250 gallons, the pressure cooker is designed for internal kettle pressures to 15 psi and steam pressures in jacket to 90 psi.

FREE Hamilton Data Sheet H-12. Write Dept. L.

Hamilton copper and brass works

Division of the Brighton Copper Works, Inc. • 820 State Ave., Cincinnati, Ohio

Men & Companies

New vice-presidents of Kraft Foods Co. are (left to right): **William O. Beers,** director of foreign operations (also elected new company director), **Howard G. Bergdoll,** general manager of Western Div., **Julian V. Jones,** general manager of Southwestern Div., and **R. E. Keator,** manager of Eastern Div. **Byron H. Prentice, Jr.** (right), general manager of the Wisconsin Div., has also been named new director.

Industry

Bordo Products Co., Stokely-Van Camp and **Suni-Citrus Corp.** are jointly beginning construction in Haines City, Fla. on a $1.5 million citrus concentrate plant.

Can-a-Pop, soft drink manufacturers, have begun construction of $1,250,000 cannery in Los Angeles.

H. P. Cannon & Son, Inc. will establish a new plant in Dunn, S. Car. to be used immediately for canning of red peppers.

Cantrell & Cochraine Corp. has opened its second plant in Los Angeles with equipment valued at $500,000 to serve 11 western states.

Continental Baking Co. will spend $58,000 on alterations and additional storage facilities at its Richmond, Va., factory.

Continental Grain Co. is planning a $1,250,000 addition to its E. St. Louis, Ill. elevators.

Crowley's Milk Co., Inc. has announced purchase of Jersey Milk & Cream Co. of La Fargeville, N. Y.

Dole Hawaiian Pineapple Co. has announced it will consolidate its San Francisco and San Jose offices in a building to be erected in San Jose.

Franklin Ice Cream Co. will build a new $400,000 plant at Bedford, Ohio.

Frozen Foods Marketing Institute, Inc., capitalized at $100,000, has filed a charter of incorporation in Delaware.

General Mills, Inc. is entering the Canadian home products market with immediate construction of package foods factory in the Toronto area.

Great Western Sugar Co., Denver, suffered a $300,000 loss by fire at its beet pulp warehouse and pellet mill.

International Packers, Ltd., Chicago, has named H. H. Luning president and general manager, and A. Thomas Taylor, chairman of the board of directors, in addition to his position as vice-president.

Kansas Soya Products Co. at Emporia is constructing a new half-million bushel elevator to cost over $300,000.

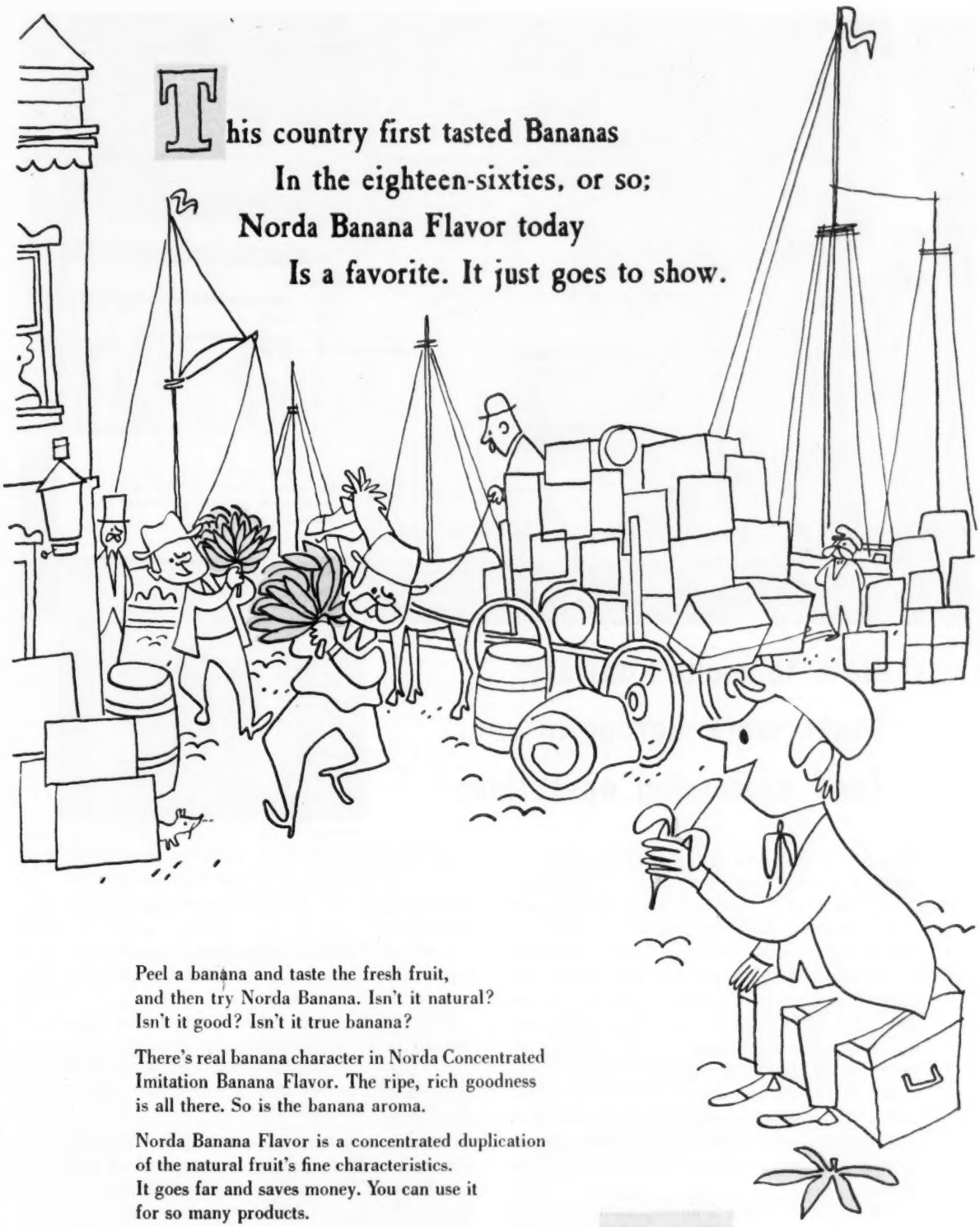
H. W. Lay & Co., Inc. plans to build a $1,250,000 food processing plant in Atlanta.

McLarens Ltd. opened its new $500,000 one-story food packing plant in Vancouver and also announced completion of a $250,000 addition to the main factory in Hamilton.

Minute Maid Corp. has installed equipment in its Lakeland, Fla. building to increase production of orange concentrate by 30 per cent.

National Biscuit Co. has awarded the general contract for construction of its new biscuit and cracker bakery in Philadelphia to White Construction Co., Inc.

Anthony Heiden has been made head of the newly created Service and Maintenance Dept. of Fox Head Brewing Co., Waukesha, Wis.



This country first tasted Bananas
In the eighteen-sixties, or so;
Norda Banana Flavor today
Is a favorite. It just goes to show.

Peel a banana and taste the fresh fruit, and then try Norda Banana. Isn't it natural? Isn't it good? Isn't it true banana?

There's real banana character in Norda Concentrated Imitation Banana Flavor. The ripe, rich goodness is all there. So is the banana aroma.

Norda Banana Flavor is a concentrated duplication of the natural fruit's fine characteristics. It goes far and saves money. You can use it for so many products.

Norda wants you to test, try, and taste it. Send for generous free samples.

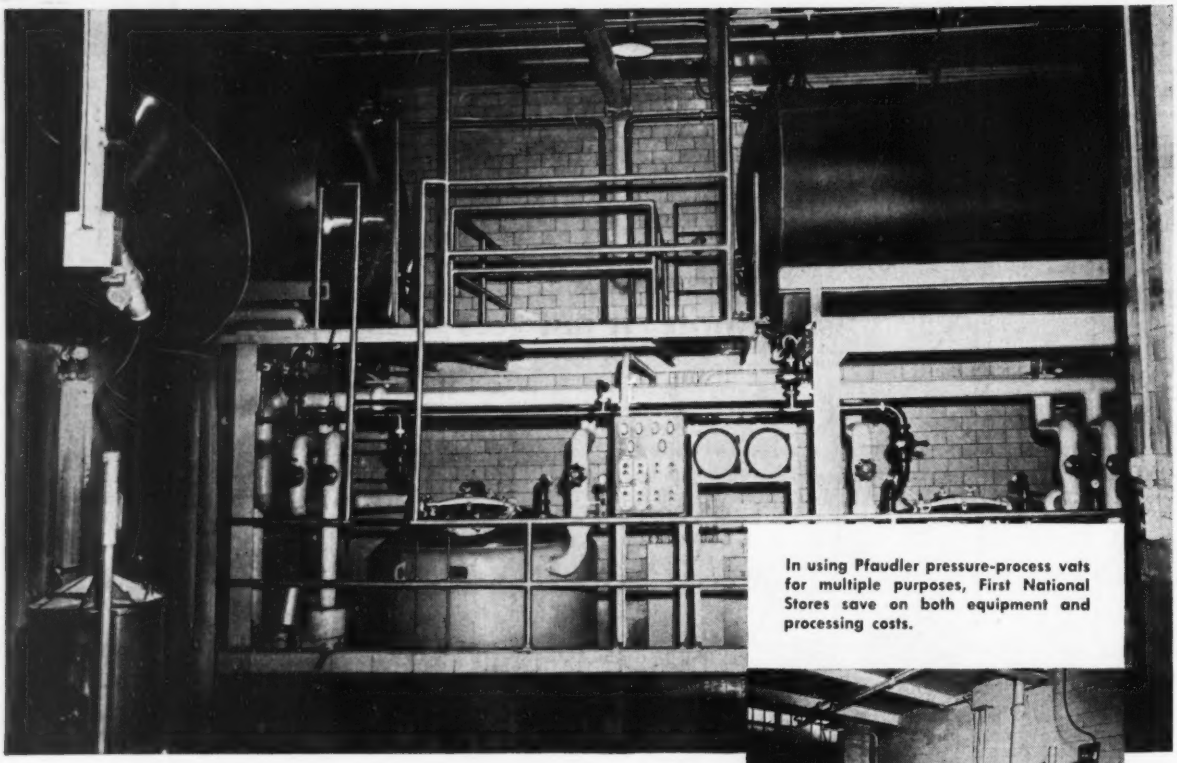
Use "A Favorite to Flavor It" . . . A Norda Flavor

Norda

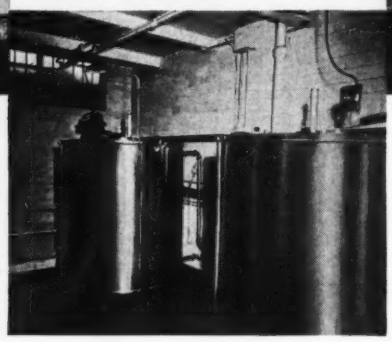
ESSENTIAL OIL & CHEMICAL COMPANY, INC.
601 West 26th Street, New York 1, N. Y.

CHICAGO • LOS ANGELES • SAN FRANCISCO • ST. PAUL • DALLAS • MONTREAL • TORONTO • HAVANA • LONDON • PARIS • GRASSE

For more information, use coupon on page 159.



In using Pfaudler pressure-process vats for multiple purposes, First National Stores save on both equipment and processing costs.



How to make sanitary tanks work harder in your food processing operations

As a means of cutting food processing costs, you ought to consider how various types of food handling vessels can be used to do more than one job.

For example, First National Stores, Portland, Maine, use the Pfaudler stainless steel equipment shown above for heating, holding, mixing and cooling. Frequently blending or mixing can be done in off-hours with savings in time and labor.

Pfaudler pressure-process vats are so designed that you can heat, hold, mix and cool liquids efficiently in a single unit. Liners of these vessels are built with spiral channels through which heating or cooling agents can be circulated at high velocity, forcing fast heat exchange from liner wall to product.

Agitation, of course, is an important aspect of fast heat transfer, too. Pfaudler process vats are equipped with agitators that accelerate the product contact with the walls of the vat. Two-speed drives enable you to vary the RPM best suited to each application.

Whether of vertical or horizontal construction, Pfaudler food processing vessels are sanitary in every detail.

Easy to clean, they assure freedom from contamination. From the standpoint of safety, they meet ASME standards. Much of this equipment is available in standard designs which mean lower initial costs.

So before you buy any equipment for blending, mixing, holding, preheating or storage, check first with Pfaudler. As a starter, send for Bulletins 871 and 884-FE-2, to see how this equipment might fit into your operations.

THE PFAUDLER CO. Pfaudler REG. U.S. PAT. OFF. **ROCHESTER 3, N. Y.**

E. J. Watson, formerly vice-president and general manager of PictSweet Foods, Inc., Mt. Vernon, Wash., has been elected president of the company.

National Dairy Products Corp. will take over operation of White Ice Cream & Milk Co., in Wilmington, N. C.

Northland Wild Rice Ltd., Winnipeg, Man. is erecting a plant to produce fresh-frozen cooked wild rice.

Omar, Inc. has ordered its 30th Luria-designed, standardized steel-frame bakery for an Indianapolis site.

Peacock Meat Co. of Rocky Mount, N. C., has been incorporated with authorized stock of $200,000.

Pepsi-Cola Co. will build a $50,000 addition to its bottling works at Louisville.

Swift & Co. has awarded contracts for an extensive modernization program at its Sioux City, Iowa plant.

Table Talk Pastry Co. will construct a three-story pastry processing building in Boston.

Welch Grape Juice Co. announced a $758,000 expansion program for its Kennewick and Grandview works in Washington.

Paramount Citrus Assn., Inc. is building a new $500,000 lemon juicing plant in Santa Barbara, Calif.

Pepsi-Cola has announced the appointments of J. K. Wright as vice-president and general manager of Pepsi-Cola Metropolitan Bottling Co. of Philadelphia, and J. J. McCaffrey as manager of the Boston company.

Personnel

Harry L. Archer has been named general manager of Borden Co.'s ice cream operations in the U. S.

Dr. Howard Bauman has joined the Research and Development Dept. of Pillsbury Mills, Inc. as head of the microbiological section in Minneapolis.

P. Goff Beach, Jr. has been appointed vice-president of operations of Oscar Mayer & Co.

E. E. Beisel, president of Pepsi-Cola Bottling Co. of Chicago, is new president of Chicago Soft Drink Foundation.

A. H. Blount of Tea Garden Products Co. has been elected chairman of the Preserve, Maraschino Cherry and Glace Fruit Section of the Canners League of California.

Harold A. Budde is new president of Purity Baking Co., Decatur, Ill.

Joseph S. Cunningham has joined Dairy Industries Supply Assn., Inc.'s staff as general executive assistant.

J. O. Epeneter has been appointed general manager of Armour and Company's refinery division.

L. Frederick Gieg has been appointed vice-president for production of John H. Dulany & Son, Inc., Maryland canned and frozen food producer.

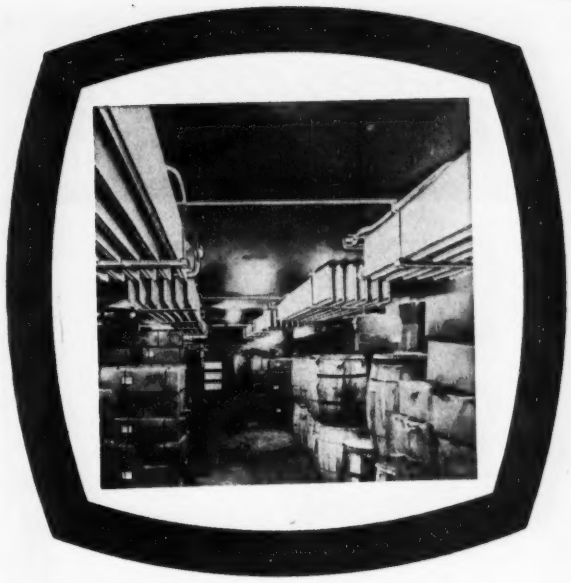
H. Philip Hodes is new manager of Hines-Park Foods' dairy products division.

Oscar A. Hallberg has been elected to the board of directors of Processed Apples Institute, Inc.

R. C. Littauer and **Robert E. Haynes** have joined General Foods' Assoc. Products Div.

E. J. Kunkel of Cudahy Packing Co., Omaha, has been elected president of Omaha-Denver Committee of Livestock Conservation, Inc.

Dr. Arnold H. Johnson, winner of the C. E. Gray award for achievement in research and development of standards for dry milk, has been elected president of National Dairy Research Laboratories, Inc., Oakdale, L. I.



Where the best in refrigeration is required . . . specify . . . DOLE

VACUUM COLD PLATES

The intensely cold DOLE **VACUUM COLD PLATES,** installed in overhead banks, keep frozen foods at proper temperature until time of delivery, thus insuring retention of quality and flavor. In addition, the natural air circulation created by DOLE **VACUUM COLD PLATES** reduces dehydration and increases operator comfort. DOLE **VACUUM COLD PLATES** are available in various sizes to fit any cold storage room.

WRITE FOR CATALOG AE

DOLE REFRIGERATING COMPANY
5950 N. Pulaski Road, Chicago 30, Ill.
103 Park Avenue, N. Y. 17
In Canada: Dole Refrigerating Products, Ltd.
44 Elgin Street, Brantford, Ontario

Maximum Refrigeration Efficiency
DOLE
MANUFACTURERS OF
THE Cel LINE

Strahmann

HOSE STATIONS and MIXING UNITS

SOLVE YOUR WASH-UP PROBLEMS

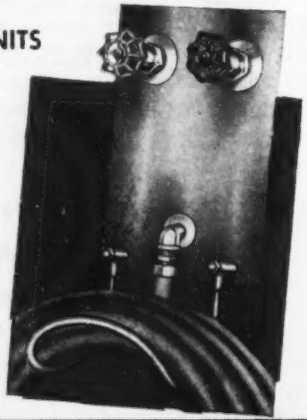
For Hot and Cold Water or Steam and Cold Water

The popular Strahman Hose Stations and Mixing Units are made in the following practical types:

- Open wall type.
- Recessed wall type.
- Pedestal floor type.
- Temperature indicating.
- Three-Line . . for adding an extra element to the wash water mix.

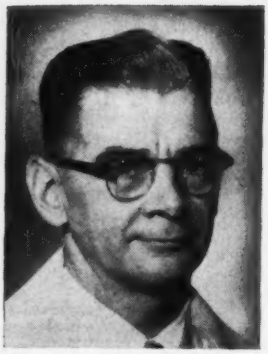
RECESSED TYPE UNITS

Designed for new construction where concealed piping is desired together with good looks. The assembly is covered by a removable stainless steel plate.



Consult your dealer or write direct for full information

STRAHMAN VALVES, INC., 16 HUDSON STREET NEW YORK 13, U.S.A.



Walter H. Lappen has been named head of the Quality Control Department in Frozen Foods Div. of Phillips Packing Co., Inc., Cambridge, Md.

Frank L. Murphy is new Pacific Coast Div. manager for National Starch Products Inc.

Robert Ransford has joined the food technology staff of Red Wing Co., Fredonia, N. Y.

Herbert Rumsey, Jr. has been elected to the newly created post of executive vice-president of Tobin Packing Co., Rochester, N. Y.

Willard L. Simmons is new president of Consolidated Dairy Products Co. of Long Island City.

Vernon Whitney was elected president of the Northwest Canners Assn. at its 40th annual convention in Portland, Ore.

Hans Zullig, developer of original Real Gold fruit beverage formulas, has joined the newly formed Real Gold Co. as director of quality control.

Associated Industries

Allegheny Ludlum Steel Corp. has appointed Dr. Rush A. Lincoln as chief metallurgist.

American Can Co.'s warehouse in Tampa was destroyed by fire with total loss estimated at about $750,000.

Clark Equipment Co.'s Service Div. has organized a Mobile Service School to offer advanced training in the maintenance and operation of materials handling equipment.

Continental Can Co. has announced plans for a $500,000 project to increase the working area and install new machinery in its Denver plant.

Crown Cork & Seal Co., Inc. has announced the merger of all wholly-owned subsidiaries with the parent company.

Crystal Transparent Corp. is moving its plant and offices from New York City to expanded quarters in Englewood, N. J.

Du Pont Co. has started work on a new $3 million polychemical laboratory in Wilmington, Del. to replace the present facilities at Arlington, N. J.

Ekco Products Co.'s new vice-president in charge of the foil division is Lloyd W. Sichel.

Freuhauf Trailer Co. has opened its new aluminum trailer manufacturing plant at Westfield, Mass.

Hinde & Dauch Paper Co. of Canada, Ltd. has begun construction near Toronto on one of the largest and most modern corrugated paper shipping factories in the world.

Chas. Pfizer & Co., Inc. has promoted Dr. Carl J. Brunings and Dr. Ernest M. Weber to the posts of Director of Chemical Research and Development and Director of Biochemical Research and Development, respectively.

Deaths

William G. Allen, 77, pioneer in the food packing industry of Pacific Northwest.—Jan. 1.

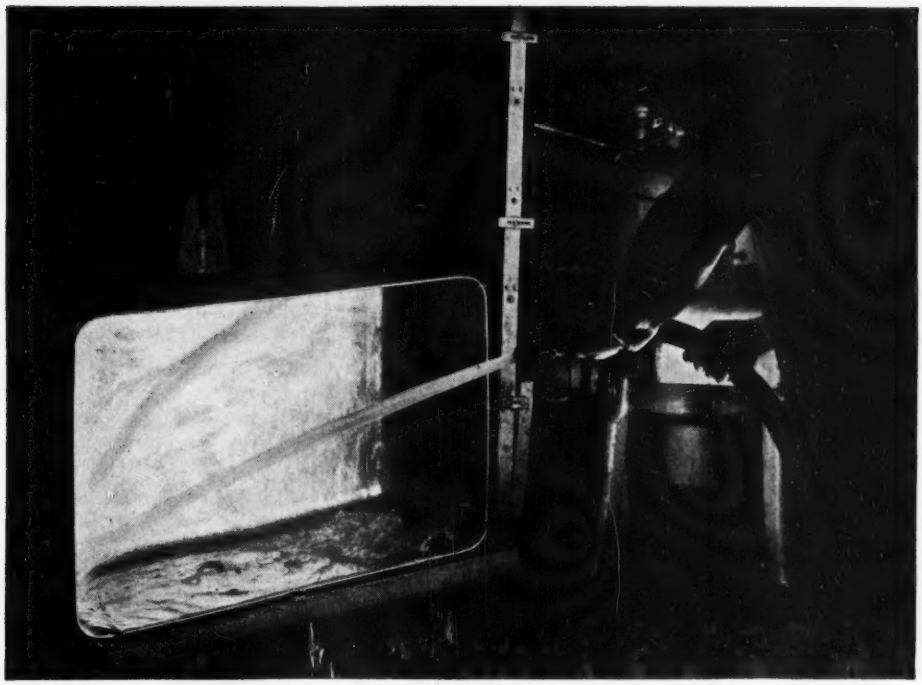
Edwin O. Edmonds, 74, chief engineer at Swift & Co., Omaha plant and partner in Insulation Specialty Co.—Dec. 23.

C. M. Ponder, 60, head of Ponder Ice Cream Co., Greer, S. C.—Jan. 12.

Dr. Willard Chandler Thompson, 63, internationally known authority on poultry.—Jan. 13.

Joseph E. Rahal, 65, one of originators of frozen food packing industry and president of Ohio Fruit Products Co. of North East, Pa.—Dec. 28.

Jeffery P. Pfaff has been appointed Manager of the Midwest Div. of Huron Milling Co.



ENDURO PROCESSING EQUIPMENT CLEANS AS EASILY AS THIS

ENDURO Stainless Steel helps food processors maintain highest sanitation standards in all types of processing, conveying and storing equipment.

The ease with which this ENDURO Stainless Steel meat products container is cleaned will interest everyone who operates metal equipment. A warm water rinse usually restores ENDURO surfaces to sparkling cleanliness. Occasionally, some more stubborn materials may require brushing or the use of stronger cleaning compounds. Not often, though.

What makes ENDURO so remarkably easy to clean and to keep clean? It is solid stainless steel, with no applied surface to chip, peel or crack. It is strong, tough, durable. Takes quite a knocking around without coming up dented or abraded. It resists rust and corrosion, and the action of most acids and alkalies. Result: ENDURO equipment presents a smooth, hard surface. Residue and contaminants have little foothold. They flush away.

Think what this ease of cleaning can mean . . . in man-hours saved . . . in greater utilization of equipment . . . in fast change-over . . . in protection against product spoilage . . . in greater earning power. Ask your supplier, or write Republic for help in applying ENDURO Stainless Steel to your equipment needs.

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic
REPUBLIC STEEL
ENDURO STAINLESS STEEL

Other Republic Products include Ex-L-ite Tin Plate, Pipe, Sheets, Bolts and Nuts, Electrunite Tubing, Niles Barrels and Drums

For more information, use coupon on page 159.

Satisfaction rests on the carton

Nebraska Consolidated Mills Co. uses this good-looking Union corrugated shipping container to merchandise its Duncan Hines franchise name and tie its product in strongly with the famous "Adventures in Good Eating" series. Union's outstanding package design service can help you create a more effective container, and Union's attractive board stock (manufactured on double-headbox paper machines) and superior color printing will make the most of it for you.

TRADE MARK UNION
INTEGRATED PLANNING
INTEGRATED PRODUCTION

UNION BAG & PAPER CORPORATION

CORRUGATED CONTAINER DIVISION • Box Plants: Savannah, Ga., Trenton, N. J., Chicago, Ill.

Eastern Division Sales Offices: 1400 E. State St., Trenton 9, N. J. • Southern Division Sales Offices: P.O. Box 570, Savannah, Ga.
Western Division Sales Offices: 4545 West Palmer, Chicago 39, Ill. • Executive Offices: Woolworth Bldg., New York 7, N. Y.

Just Off the Press

New Catalogs and Bulletins from manufacturers of equipment and supplies —Free For The Asking—

Food Plant Equipment

Steel Tubes

Applications, advantages and characteristics of seamless and welded stainless steel tubes. Bulletin S-222.8 p. —*Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 46.*

Circle 221A on Reader Service Card

Metal Fastener

Description and photos of fastening machine for use on vacuum sealed products. 4 p. brochure.—*Vac-Tie Fasteners Inc., 1140-1146 E. Jersey St., Elizabeth 4, N. J.*

Circle 221B on Reader Service Card

Pump Types

Specifications and illustrations of three types of sewage and sump pumps. Bulletin 325-A. 8 p.—*American-Marsh Pumps, Inc., Battle Creek, Mich.*

Circle 221C on Reader Service Card

Purifier Units

Line-type purifiers for steam or air applications. Bulletin 201. 4 p.—*V. D. Anderson Co., 1935 W. 96th St., Cleveland 2.*

Circle 221D on Reader Service Card

Combination Burners

Photos and performance features of fan type combination burner for gas or oil. Bulletin R-100. 4 p.—*Eclipse Fuel Engineering Co., Rockford, Ill.*

Circle 221E on Reader Service Card

Packaging Model

Description and photos of Model 200 packager and accessory devices. 4 p. brochure.—*Niagara Packaging Machinery Corp., 35 Clyde Ave., Buffalo 15, N. Y.*

Circle 221F on Reader Service Card

Speed Reducers

Small size speed changers for applications requiring limited space yet durability. Sheets 10 and 11. —*Metron Instrument Co., 432 Lincoln St., Denver 3.*

Circle 221G on Reader Service Card

Expansion Joints

Description and illustration of slip-type expansion joints. 4 p. pamphlet.—*Yarnall-Waring Co., Mermaid Lane, Philadelphia 18.*

Circle 221H on Reader Service Card

Fluid Controls

Comprehensive line of small valves, pressure regulators, stainless steel cylinders, flo-gages and oxy-gas torches in elaborate description, diagrams and photos, engineering data sheets and tables. Catalog 2. 66 p.—*Hoke Inc., 227 South Dean St., Englewood, N. J.*

Circle 221I on Reader Service Card

Pump Motors

Construction features of various types of hollow and solid shaft vertical pump motors. Bulletin 1250.—*Louis Allis Co., 1324 W. Wisconsin Ave., Milwaukee 7.*

Circle 221J on Reader Service Card

Vibrating Screen

Two models of vibrating screen with or without supports for food processing. Folder 2435. 4 p.—*Link-Belt Co., 301 W. Pershing Rd., Chicago 9.*

Circle 221K on Reader Service Card

Pulverizing Equipment

Air attrition impact pulverizer and classifier in single unit. Three leaflets.—*Schutz-O'Neill Co., 307 Portland Ave., Minneapolis 15.*

Circle 221L on Reader Service Card

Air Cleaner

Description of oil bath air cleaner for fines escaping primary collector. Bulletin 285.—*American Air Filter Co., Inc., Louisville 8.*

Circle 221M on Reader Service Card

Cooling Controls

Information on applications, engineering data, dimensions and specifications of refrigeration and air conditioning controls. Bulletin 1487-Y. 24 p.—*Penn Controls, Inc., Goshen, Ind.*

Circle 221N on Reader Service Card

Can Cutter

Description of various units for seam control, including disc cutter, seam projector, and seam slitting saw. Two folders. Each 4 p. —*Wilkens-Anderson Co., 4525 W. Division St., Chicago 51.*

Circle 221O on Reader Service Card

Gear Motors

Colorful, illustrated description of several types of gear motors. Catalog GEA-6027. 14 p.—*General Electric Co., Schenectady, N. Y.*

Circle 221P on Reader Service Card

Precision Labeler

Features of machine to handle labels in roll form or decalcomania with precision registry. Catalog 64-5M-553-NPD. 8 p.—*New Jersey Machine Corp., 1610 Willow Ave., Hoboken, N. J.*

Circle 221Q on Reader Service Card

Lasting Efficiency at Lower Cost

These GGU Pumps are in service in every industry which employs liquids in processing. Discharge may be in any of eight positions. Small amount required of special metals for handling corrosives.

PUMPS "by Aurora"
For Every Purpose
TYPE-GGU Aurora Side Suction Centrifugal Pump.
APCO Turbine-Type PUMPS
—ideal for "1001" duties where small capacities and high heads predominate. Get acquainted.
WE ARE EXCLUSIVE BUILDERS OF FINE PUMPS
Our entire personnel and facilities are devoted to pump design and manufacture. PUMPS by Aurora recognize no superior.
We Invite Your Special Pump Problems
Write for CONDENSED CATALOG "M"

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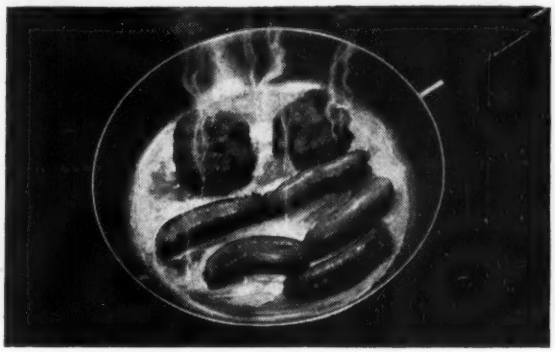
AURORA Always PUMPS

AURORA PUMP COMPANY

DIVISION OF THE NEW YORK AIR BRAKE COMPANY

71 DEARBORN STREET, AURORA, ILLINOIS



Puts sizzle in sausage sales

Pork sausage with Huron MSG tastes better and sells better! And meat packers have learned that Huron MSG helps keep fine pork flavor longer in storage. It takes only 1½ oz. of Huron MSG to boost the flavor of 100 pounds of sausage. For samples and formula recommendations, write The Huron Milling Company, 9 Park Place, New York 7, N. Y.

HURON MSG

PURE MONOSODIUM GLUTAMATE 99+%

Made by the pioneers in protein derivatives

More "carne" flavor for chili con carne

"Carne" in "chili con carne" means *meat* . . . and Huron HVP means added good meat flavor! Only 6 oz. of Huron HVP per 100 pounds greatly increases the appetite appeal of your brand of canned, frozen or brick chili . . . and strengthens your sales position as well. Huron's Technical Service will gladly help you with formulas and samples. The Huron Milling Company, 9 Park Place, New York 7, N. Y.

HURON HVP

HYDROLYZED VEGETABLE PROTEINS

The flavor of meat from wheat

R_x for more clam chowder sales

No mystery about it—Huron MSG brings out the delicate flavors of the fish and seasonings in canned and frozen clam chowder like nothing else can! It only takes ¾ oz. per 100 lbs. of product—but it's worth its weight in gold for creating brand preference. Ask Huron's Technical Service to help you work out the right formula. The Huron Milling Co., 9 Park Place, New York 7, N. Y.

HURON MSG

PURE MONOSODIUM GLUTAMATE 99+%

Made by the pioneers in protein derivatives

Closing Machine

Models of automatic machine for closing paper and cellophane bags with pasted, flat top seal. Leaflet.—*Bemis Bro. Bag Co., Minneapolis.*

Circle 222A on Reader Service Card

Gate Valves

Specification data and leading dimensions of line of all-iron and iron body, bronze mounted gate valves. Circular 561. 4 p.—*Lunkenheimer Co., Box 360, Cincinnati 14.*

Circle 222B on Reader Service Card

Steel Plates

Revised listing of stainless steel plates, forgings, sheets, tank heads and flanges. Bulletin 652-5M-Ref. C. 4 p.—*G. O. Carlson, Inc., 550 Marshalton Rd., Thorndale, Pa.*

Circle 222C on Reader Service Card

Film Evaporator

Description and colorful illustrations of operation of turbulent thin-film evaporator through use of controlled rotor blades. Catalog 353. 12 p.—*Rodney Hunt Machine Co., 43 Vale St., Orange, Mass.*

Circle 222D on Reader Service Card

Filter Presses

Heavy steel plate fabricated industrial filter presses requiring no gaskets.—Bulletin 17. 4 p.—*Brosites Products Corp., 50 Church St., New York 7.*

Circle 222E on Reader Service Card

Carton Opener

Machine for setting up lock-bottom bottle carryouts. 4 p. brochure.—*Atlanta Paper Co., Atlanta, Ga.*

Circle 222F on Reader Service card

Materials Handling

Hoisting Equipment

Features of types of hoists for different jobs in booklet which won first award for advertising excellence at 1953 Triple Industrial Supply Convention. 12 p.—*Yale & Towne Mfg. Co., Roosevelt Blvd. & Haldeman Ave., Philadelphia 15.*

Circle 222G on Reader Service Card

Lift Truck

Description, specifications and on-the-job photos of 4000-lb. capacity truck featuring trunnion-mounted steering and pneumatic tires. Form 1284. 8 p.—*Hyster Co., 2902 N. E. Clackamas St., Portland 8.*

Circle 222H on Reader Service Card

Floor Trucks

Illustrations and specifications of combined tractor-trailer and tow-line order picking system for warehouses, 50 models of floor trucks, 16 styles of casters, and 12 dollies. Junior Catalog 54G. 12 p.—*Nutting Truck & Caster Co., 1469 W. Division St., Faribault, Minn.*

Circle 222I on Reader Service Card

Adjustable Ramp

Features of non-floating hydraulic adjustable ramp for loading docks. Catalog Sheet.—*Rowe Methods Inc., 2534 Detroit Ave., Cleveland 13.*

Circle 222J on Reader Service Card

Pallet Loader

Operation and installation data on automatic pallet loader. Form 748-5M. 16 p.—*Lamson Corp., Syracuse, N. Y.*

Circle 222K on Reader Service Card

Barrel Skids

Magnesium barrel skids with all-replaceable parts and rubber truck rests. Leaflet MSK 802.—*Mag Line Inc., Pinconning, Mich.*

Circle 222L on Reader Service Card

Delivery Bodies

Description of various models in line of custom-engineered, hi-tensile steel truck bodies. 16 p. booklet.—*Boyertown Body & Equipment Co., 1521-27 N. 33 St., Philadelphia 21.*

Circle 222M on Reader Service Card

Plant Supplies

Cleaning Methods

Ways to cut cleaning costs in candy plants. Booklet F9086. 20 p.—*Oakite Products, Inc., 19 Rector St., New York City 6.*

Circle 222N on Reader Service Card

Floor Maintenance

Description of program and products for cleaning, sealing, and maintaining all kinds of floors. Illustrated folder.—*West Disinfecting Co., 42-16 W., Long Island City, N. Y.*

Circle 222O on Reader Service Card

Botanical Insecticide

Information on insecticide for positive control of European corn borer, sugar cane borer and cranberry fruitworm and promising against stored grain pests and others. 20 p. illustrated booklet.—*S. B. Penick & Co., 50 Church St., New York City 8.*

Circle 222P on Reader Service Card

Welded Piping

Uses of welding fittings, piping and flanges. Leaflet.—*Tube Turns, Inc., Louisville 1.*

Circle 222Q on Reader Service Card

Sanitation Products

Information on sanitation and maintenance products for public buildings and industrial plants. 48 p. illustrated catalog.—*Huntington Laboratories, Inc., Huntington, Ind.*

Circle 222R on Reader Service Card

SAVES $1125 A YEAR . . .

with 4 **BIN-DICATOR** BIN-LEVEL INDICATORS

Three-stage conveyors filling silos from under-car hoppers had no automatic feed control. If either of last two conveyors stopped, preceding one jammed; had to be opened, cleared by hand. Workman suggested Bin-Dicators which stop feed automatically; now save $1125 yearly in labor and material alone for this leading chemical manufacturer.

BIN-DICATOR, "The Eyes of the Bin" automatically reports levels of materials in bins, chutes, hoppers, etc., controls conveyors and filling systems.

NEW CATALOG FREE

THE BIN-DICATOR CO.
13946-R Kercheval • Detroit 15, Mich.

Sales success for sauce

• Chinese style sauce is rapidly becoming a favorite household food seasoning and cooking ingredient. Much of the taste-appeal of the leading brands comes from Huron HVP—the natural protein derivatives Huron obtains from wheat. Huron HVP imparts a "meatiness" that does things for flavor—and for sales. Let Huron's Technical Service tell you which HVP to use for improving your product's flavor, and send you samples. The Huron Milling Company, 9 Park Place, New York City 7.

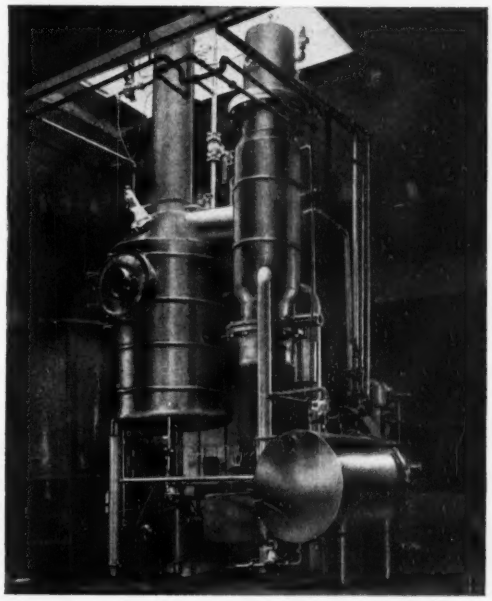
HURON HVP

HYDROLYZED VEGETABLE PROTEINS

The flavor of meat from wheat

LO-TEMP

• Concentrates Flavors
• Recovers Solvents



Mojonnier Lo-Temp Still in large western vanilla plant.

Lo-Temp Stills permit concentration of flavoring extracts and recovery of solvents used for extraction. Volatile top flavors are vaporized, recondensed, and collected in a receiving tank. Additional solvent is distilled into a second tank. Solvent from the first receiver is blended back into concentrate, restoring top flavors and dissolving "cloud." Solvent from second receiver can be re-used. This process saves expensive solvents, reduces shipping, packaging, and storage costs. Distillation temperatures can be adjusted from 40° to 80° F. Capacities from 25 to 25,000 lbs. per hour. Write for complete information.

Mojonnier Bros. Co., 4601 W. Ohio St., Chicago 44, Ill.

Mojonnier

LO-TEMP EVAPORATORS

Mojonnier Engineered Equipment for the Food Industry includes:
VACUUM PANS • COLD-WALL TANKS • COMPACT COOLERS
CONVEYORS • ZONE-CONTROL VATS • EVAPORATORS
TUBULAR HEATERS • TUBULAR COOLERS • MILK TESTERS
VACUUM FILLERS • CASE WASHERS • BULK COOLERS • BULK
TANKERS • BALANCE TANKS • CUT-WRAP MACHINES • OVERRUN
TESTERS • CULTURE CONTROLLERS • BUTTER PRINT SCALES
PROCESSED CHEESE KETTLES

For more information, use coupon on page 159.

White *Quality*

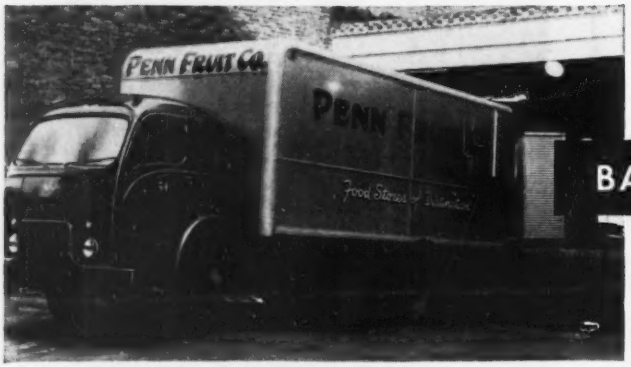
Helps Penn Fruit Co. SELL QUALITY

PRECISION deliveries by modern White 3000 are helping Penn Fruit Co., of Philadelphia, boost its dollar volume of sales and are important factors in Penn Fruit expansion plans.

"The White 3000", Harry Cooke, director of transportation and warehousing of Penn Fruit, says, "gives us the most modern and efficient transportation possible... saves time in congested city service... keeps our costs low."

"But more than that, they tell our many customers that we *buy* quality and *sell* quality in all our 28 stores."

REFRIGERATED SERVICE—

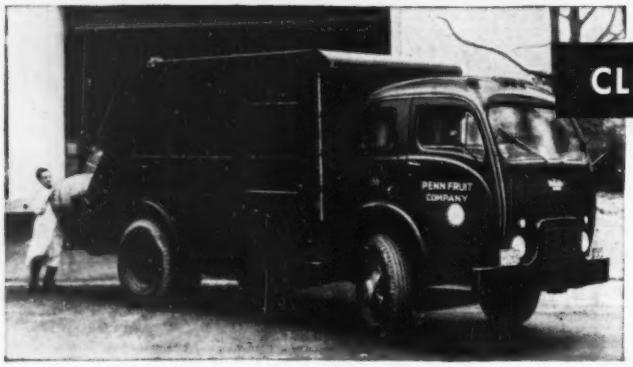


This is one of the White Model 3026's with refrigerated body, handling meats and frozen foods on time-table schedules.

BAKED GOODS

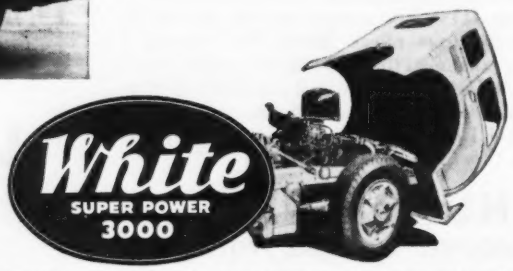
This Model 3018 White transports baked goods to the network of Penn Fruit stores in Philadelphia area. Modern, mobile units keep baked goods fresher, tastier!

CLEANLINESS, TOO!



This is one of three White 3000's on Rot-O-Pac service keeping garbage and rubbish on the move. This unit has 16 yd. capacity. Three Whites took the place of 6 dump trucks... speeded service, too.

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio



FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

Petroleum Products

Descriptive data, specifications and lists of typical applications for white oils, petroleums, odorless solvents, petroleum sulphonates, and soluble oil bases. 4 p.—*Pennsylvania Refining Co., Butler, Pa.*

Circle 225A on Reader Service Card

Glass Pipe

Introduction of line of sink traps and fittings and physical properties of standard items of glass pipe and fittings. Revised catalog.—*Corning Glass Works, Corning, N. Y.*

Circle 225B on Reader Service Card

Water Softener

Solution to problems in regenerating zeolite water softeners in form of evaporated salt pellets. Folder.—*International Salt Co., Inc., Scranton, Pa.*

Circle 225C on Reader Service Card

Steel Elbows

Long and extra long male elbows in steel, as addition to standard stock line. Catalog File 4310 A 11.—*Parker Appliance Co., 17325 Euclid Ave., Cleveland 12.*

Circle 225D on Reader Service Card

Non-Corrosive Desiccant

Several types of non-corrosive, odorless, tasteless and non-toxic desiccants, also flexible or rigid moisture barriers. 4 p. folder.—*Eagle Chemical Co., Inc., 146 Industry Ave., Joliet, Ill.*

Circle 225E on Reader Service Card

Metal Flooring

Advantages of durable, long lasting steel plate flooring for areas subjected to extreme production or traffic abuses. 4 p. folder.—*Flash-Stone Co., Inc., 3723 Pulaski Ave., Philadelphia 40.*

Circle 225F on Reader Service Card

Plastic Aprons

Industrial safety aprons and sleeves of non-absorptive, flexible, transparent plastic. Leaflet.—*Pulmosan Safety Equipment Corp., 644 Pacific St., Brooklyn 17.*

Circle 225G on Reader Service Card

Insulating Material

Photos and descriptive details of actual applications of Foamglas insulating material. 4 p. brochure.—*Pittsburgh Corning Corp., 1 Gateway Center, Pittsburgh 22.*

Circle 225H on Reader Service Card

Floor Finishes

Reference chart giving coverage specifications, product information and applications of floor finishes and cleaners. 2-color foldout chart.—*Multi-Clean Products, Inc., 2277 Ford Parkway, St. Paul.*

Circle 225I on Reader Service Card

Dairy Cleaner

Improved, dust-free detergent for use especially in dairies. Form DS-7. 6 p.—*Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14.*

Circle 225J on Reader Service Card

Metal Coatings

Applications and advantages of metallizing process to provide protective coatings or supplement present finishes. 4 p. brochure.—*Protective Coatings Div., Metalwald, Inc., Scotts Lane & Abbottsford Ave., Philadelphia.*

Circle 225K on Reader Service Card

Combination Locknut

Engineering details and specifications of patented combination standard nut and retainer fabricated into single standard unit. 8 p. brochure.—*Security Locknut Corp., North Ave. & 15th Ave., Melrose Pk., Ill.*

Circle 225L on Reader Service Card

Control Equipment

Hand-Operated Scale

Photos and description of semi-automatic gross bagger for weighing and controlled filling. Bulletin 5301.—*Richardson Scale Co., Van Houten Ave., Clifton, N. J.*

Circle 225M on Reader Service Card

Pressure-leaf Filters

Data on sizes, capacities and dimensions for both vertical and horizontal pressure-leaf filters with photos, diagrams and charts and additional information on engineering and installation services. Catalog NC-1-53. 20 p.—*Niagara Filters Div., American Machine & Metals, Inc., E. Moline, Ill.*

Circle 225N on Reader Service Card

Electronic Controls

Information on electronic controls for hot water heating systems for all types of commercial structures. Bulletin F 6167. 8 p.—*Barber-Colman Co., Rockford, Ill.*

Circle 225O on Reader Service Card

Keys and Switches

Information on industrial or laboratory keys and switches, including photos and line drawings of design features, and selection tables. Catalog E. 12 p.—*Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44.*

Circle 225P on Reader Service Card

Precision Balances

Description of several models of precision chemical and microchemical balances. Bulletin 329. 4 p.—*Burrell Corp., 2223 Fifth Ave., Pittsburgh 19.*

Circle 225Q on Reader Service Card

Filling Scale

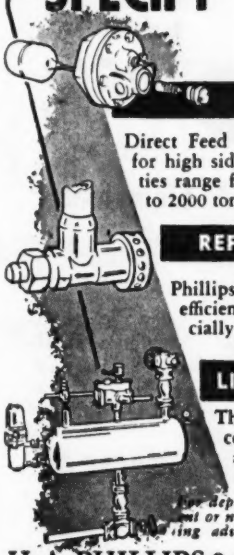
Unit for weighing within close tolerances and bagging powdered materials completely automatically. Model 600G Catalog sheet.—*Thayer Scale and Engineering Corp., E. Water St., Rockland, Mass.*

Circle 225R on Reader Service Card

"A **Simple** CONTROL IS THE **Best** CONTROL"

. . . for efficiency's sake . . .

SPECIFY PHILLIPS FLOAT CONTROLS



FLOAT CONTROLS

Direct Feed and Remote Feed types adaptable for high side or low side applications. Capacities range from 1 to 1000 tons for "Freon"; 1 to 2000 tons for ammonia.

REFRIGERANT INJECTOR

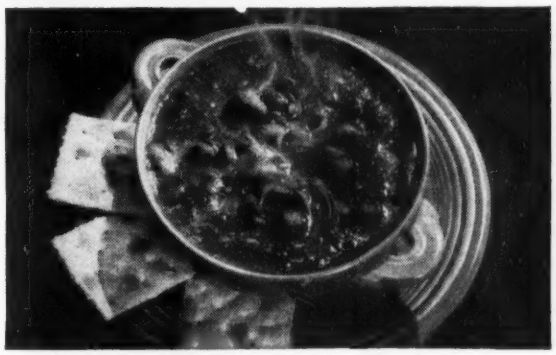
Phillips refrigerant injection provides high efficiency evaporation with "Freon", especially in high capacity, flooded operation.

LIQUID RETURN SYSTEM

The Phillips system protects ammonia compressors against liquid slop-over and gives dry suction line gas for top compressor efficiency.

For dependable, efficient operation of your present or new equipment, choose Phillips—engineering advice willingly given. Write for catalog.

H. A. PHILLIPS & CO. DESIGNERS AND ENGINEERS
REFRIGERATION CONTROLS SYSTEMS
3255 W. CARROLL AVENUE • CHICAGO 24, ILLINOIS
REPRESENTATIVES: THE C & S EQUIPMENT CO.
2103 S. San Pedro Street, Los Angeles, California
MASON EMANUELS CO. • 90 Dearborn Street, Seattle 4, Washington



Hotter sales for chili con carne

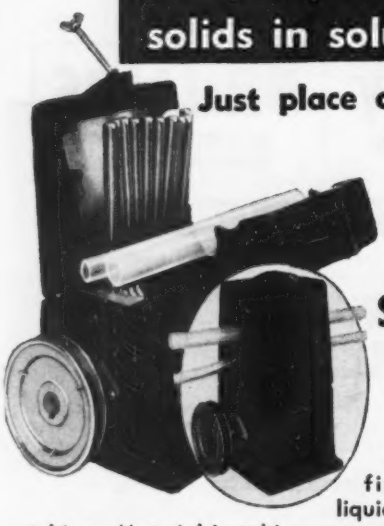
You can heighten the flavor of your chili con carne —canned, frozen, or brick and get a smoother blend of the spices by adding only 4 to 6 oz. of Huron MSG per 100 pounds. If your chili is frozen, Huron MSG will safeguard its improved flavor for longer storage periods. Let Huron's Technical Service tell you how. The Huron Milling Co., 9 Park Place, New York 7, N.Y.

HURON MSG

PURE MONOSODIUM GLUTAMATE 99+%

Made by the pioneers in protein derivatives

Pump liquids, gases, solids in solution

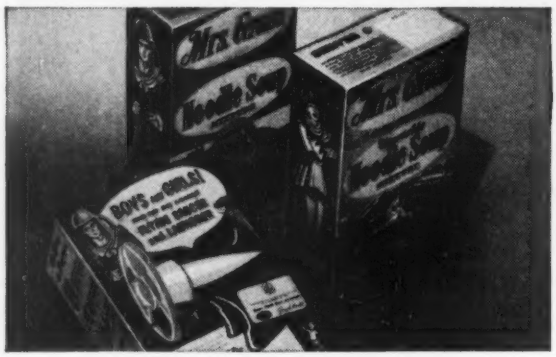


Just place connecting tubes in NEW, large Sigmamotor Pump!

• Wavelike action of steel fingers forces liquid through the tubing. Material in tubing never touches pump. Stops contamination and corrosion. Excellent for handling of corrosive solution..... **$195.00**

Smaller unit with capacities to 30 gallons per hour..... **$55.00**

SIGMAMOTOR Inc.
22 North Main Street • Middleport, N. Y.



Magic touch for dry soup mixes

• Dry soup mixes just wouldn't be possible without MSG! Most leading makers of dry soups use Huron MSG to heighten vegetable and meat flavors. MSG helps dry soup mixes compete successfully with other prepared foods on both taste *and* price. Whatever you make, it will taste better and sell better with Huron MSG. Write Huron's Technical Service, Huron Milling Co., 9 Park Place, New York City 7.

HURON MSG

PURE MONOSODIUM GLUTAMATE 99+%

Made by the pioneers in protein derivatives

Temperature Controller

Specifications and application information on models of electronic temperature controllers as well as data on resistance thermometer elements and wells. Bulletin P-811. 10 p.—*Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne and Windrim Aves., Philadelphia 44.*

Circle 226A on Reader Service Card

Flow Control

Specifications and diagrams of valve-mounted controller for high speed flow control applications. Bulletin 470. 8 p.—*Foxboro Co., Foxboro, Mass.*

Circle 226B on Reader Service Card

Fat Filter

Advantages of fat saver filter for purification of deep frying fats. 6 p. folder.—*Delpark Corp., Dept. 144, Lebanon, Ind.*

Circle 226C on Reader Service Card

Checking Meter

Automatic recording attachment for measuring turbidity in beer. Leaflet.—*Buhler Brothers, Inc., 2121 State Highway #4, Fort Lee, N. J.*

Circle 226D on Reader Service Card

Wort Clarifier

Construction data and photos of models of centrifugal clarifiers for hot wort. Catalog S. A696-Rev. 8 p.—*DeLaval Separator Co., 427 Randolph St., Chicago 6.*

Circle 226E on Reader Service Card

Testing Instruments

Unusual non-destructive testing instruments applicable to food manufacturing, including metal detectors, electronic micrometers, and power testers for quality control. Bulletin 32. 8 p.—*J. W. Dice Co., Englewood, N. J.*

Circle 226F on Reader Service Card

Miscellaneous

Dimensions Chart

Selection wall-chart designed to serve as a handy reference for determining differences in frame dimensions for a-c motors from 1-30 hp.—*Westinghouse Electric Corp., Box 2099, Pittsburgh 30.*

Circle 226G on Reader Service Card

Inter-Office Communication

Description of how executives can improve their efficiency through direct inter-office communication. Illustrated brochure. 4 pages.—*Automatic Electric Co., 1033 W. Van Buren St., Chicago 7.*

Circle 226H on Reader Service Card

Photocopy Machine

Machine for making photocopies of any office record, combining both printing and processing operations. Booklet P344.—*Remington Rand Inc., 315 Fourth Ave., New York City 10.*

Circle 226I on Reader Service Card

Sanitation Program

Description of services offered for a planned sanitation program, preventive and corrective, designed especially for individual food plants. Brochure. 8 pages.—*American Sanitation Institute, 884-86 Hodiamont Ave., St. Louis 12.*

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Multiple Copier

Methods for producing multiple copies of written, drawn, or printed material. Leaflet F-369. 4 pages.—*Eastman Kodak Co., Industrial Photographic Div., Rochester 4, N. Y.*

Circle 226K on Reader Service Card

Research Laboratories

Description and illustrations of services of new research laboratories. Vol. 6, No. 8. 28 pages.—*Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10.*

Circle 226L on Reader Service Card

Packaging Manual

Basic information on foil packaging with technical data in handy reference form on package design and application. Booklet. 48 pages.—*Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.*

Circle 226M on Reader Service Card

Roofing Problems

Discussion of various roofing problems, with photos, drawings and diagrams. Brochure U614b-11M. 32 pages.—*Tremco Mfg. Co., 8710 Kinsman Road, Cleveland.*

Circle 226N on Reader Service Card

Clad Metals

Comprehensive survey of manufacture and applications of stainless, copper, brass and other clad steels. 24 p. booklet.—*Superior Steel Corp., Carnegie, Pa.*

Circle 226O on Reader Service Card

Egg Story

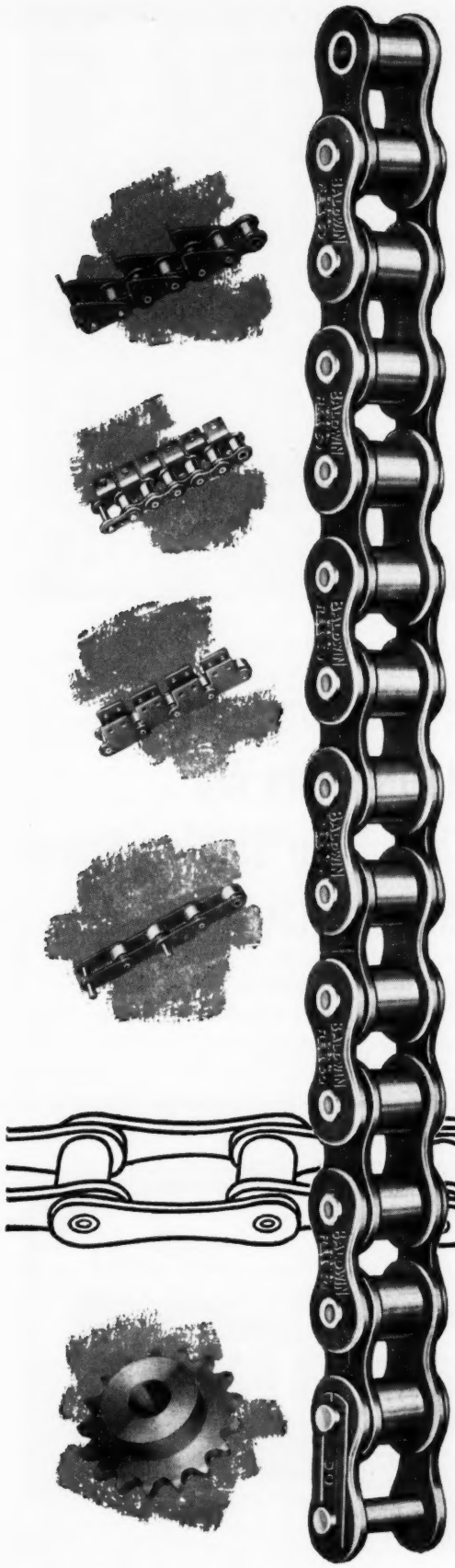
Colorful word-and-picture presentation of story of new science of egg solids. Spiral-bound booklet. 24 p.—*Egg Solids Committee, Institute of American Poultry Industries, 221 N. La Salle St., Chicago 1.*

Circle 226P on Reader Service Card

Free Literature—Fast Way

Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—page 159. Then sign at the bottom and mail.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.



SAVE handling costs

Here's a good way to solve the problem of moving materials through your production lines...the complete line of Rex Roller Chains, Sprockets and standard and special Attachments. Whether it's moving bread through a wrapping machine...milk cartons through the bottling machines...or metal parts through a plating machine, there is a Rex Roller Chain and Attachment that can do it more efficiently...at lower costs.
Your Chain Belt District Sales Engineer will be happy to assist you with your selections or to recommend the design of an attachment to suit your individual needs.
Call him or mail the coupon today.

CHAIN BELT COMPANY

District Sales Offices in All Principal Cities

CHAIN BELT COMPANY
4783 W. Greenfield Avenue
Milwaukee 1, Wisconsin

54-405B

☐ Please send me literature on Conveying with Roller Chains.
☐ Have Chain Belt man call.

Name.....

Company.....

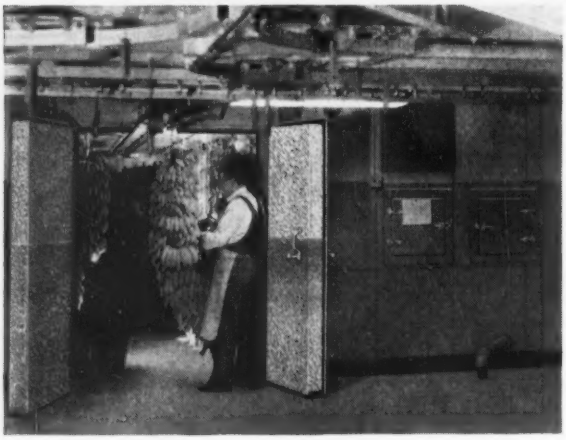
Address.....

City.....*Zone*.....*State*.....

For more information, use coupon on page 159.

From Orange Juice to Beef Steak to Strawberries, frozen foods are stored safely behind this JAMISON Super Freezer Vestibule Door at the new Safeway Stores warehouse in Oklahoma City.

Whether you're storing bulk cheese at +40°F or ripening bananas as Safeway Stores do—or have some other cold storage problem, your best solution is a JAMISON Door.



From -15° To +40°F JAMISON Doors Are On The Job For Safeway Stores in Oklahoma City

Jamison doors fit better, look better, stand-up longer because they are the result of experience gained over half a century. For information on the things JAMISON doors can do for you, specifications and dimensions, send for Catalog No. 1, Jamison Cold Storage Door Company, Hagerstown, Maryland, U.S.A.

JAMISON
HAGERSTOWN, MARYLAND, U. S. A.
The leader for over 50 years

Modern Cheesemaking

—*Continued from page 100*

platform on which the operator would stand was pushed along to enable the worker to reach the overhead cheeses.

All parts of the new racks may be easily reached for sanitizing. A rack holding 220 cheeses may be washed and sanitized in the same time formerly required for 12 wooden shelves holding a total of 110 cheeses.

Mold growth, both inside and outside of the cheese, reaches its maximum at about the 30th day. At this point, the cheeses are moved to the wash room. Here operators remove exterior mold by washing in clear water with revolving brushes. Cheeses are replaced on the racks and allowed to dry for a short period.

To stop exterior mold growth, each cheese is now hand dipped in a special grade of cheese wax, then placed on racks. Racks are returned to curing room for remainder of the curing process, covering approximately 90 days, or a total of about 120 days for entire process.

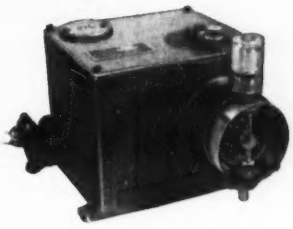
During this period a chemical breakdown of curd takes place. *P. roqueforti* appears to be the principal proteolytic agent in blue vein cheese. Hydrolysis is thought to be brought about by fat-splitting and oxidizing enzymes of the mold. The enzymes apparently attack the fat and form free fatty acids. Three of these, caproic, caprylic, and capric, along with methylamyl ketone, are thought to be greatly responsible for the sharp, peppery flavor of the cheese.

Following curing, wax is removed and the cheese is allowed to dry. Finished product is wrapped in aluminum foil and parchment paper. It is then ready for shipment to our distributor, or mailing to various parts of the world through our mail-order department.

Prior to the use of waxing, each cheese was individually washed at 30, 60, and 90 days of age. The wooden shelves had to be removed from their supports, the cheese placed upon mobile racks and moved to the wash room. This operation was repeated when the cheese was returned. In addition, the un-waxed cheeses had to be turned, at least once every other day after the 30-day water-washing and up until the end of the curing process.

In addition to the modernization program, research is being carried on for the purpose of developing (1) a mechanical waxing tank or machine; (2) methods of pumping instead of dipping cheese curd from vats, and (3) better ways of filling hoops with curd.

PRECISION
Chemical pumps



for

Sterilizing
Pumping additive solutions and emulsifiers
Chlorinating
Waste treatment

•

PRECISION MACHINE CO.

8 Walnut St. Somerville, Mass.

⅓ HP MIXER

Stainless Steel Propeller and Shaft
Adjustable Clamp
Heavy Rubber Cord and Plug

only $37.50

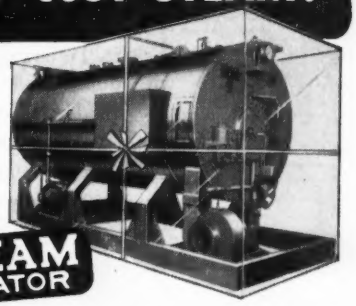
Standard Electric Mfg. Co., Inc.
WEST BERLIN 76, NEW JERSEY

For Flavor That Freezing Won't Kill, USE NATURAL SPICES

American Spice Trade Association
82 WALL STREET NEW YORK

TROUBLE-FREE PACKAGE for LOW-COST STEAM!

10 to 600 h. p.
15 to 200#
OIL or GAS



AMESTEAM GENERATOR

- Complete — ready to connect and operate.
- Saves labor — fully automatic.
- Saves fuel — 80% guaranteed efficiency.
- Easy maintenance — all parts readily accessible.

WRITE FOR FREE BULLETIN TODAY

AMES IRON WORKS INC.
BOX B-24, OSWEGO, N. Y.

AMES IRON WORKS
Box B-24, Oswego, N. Y.
Gentlemen:
Please send me further information on AMESTEAM GENERATORS and name of nearest representative.
NAME.....
COMPANY.....
ADDRESS.....
.....

For more information, use coupon on page 159.

To the Employee Relations Director of every American company

LET'S FACE IT . . . the threat of war and the atom bomb has become a real part of our life—and will be with us for years. Fires, tornadoes and other disasters, too, may strike without warning.

The very lives of your employees are at stake. Yours is a grave responsibility. Consider what may happen.

When the emergency comes, everybody's going to need help at the same time. It may be hours before outside aid reaches you. The best chance of survival for your workers—and the fastest way to get back into production—is to know what to do and be ready to do it. To be unprepared is to gamble with human lives. Disaster may happen TOMORROW. Insist that these simple precautions are taken TODAY:

☐ **Call your local** Civil Defense Director. He'll help you set up a plan for your offices and plant—a plan that's safer, because it's entirely integrated with community Civil Defense action.

☐ **Check contents** and locations of first-aid kits. Be sure they're adequate and up to date. Here again, your CD Director can help—with advice on supplies needed for injuries due to blast, radiation, etc.

☐ **Encourage personnel** to attend Red Cross First Aid Training Courses.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good employee relations—and no greater way of helping America.

Act now . . . check off these four simple points . . . before it's too late.

PROFESSIONAL SERVICES

PROCESSING PROBLEMS — PRODUCT DEVELOPMENT — MARKET RESEARCH — PLANT LAYOUT and DESIGN — PACKAGE DESIGN and TESTING MANAGEMENT — PUBLIC RELATIONS — GENERAL CONSULTING — PATENTS — CHEMICAL, BACTERIOLOGICAL and NUTRITIONAL ANALYSIS

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Consulting *Food and Chemical* *Engineers*
Specializing in:
Designing, Estimating and Engineering of New and Modernizing of Old Food and Chemical Plants and Processes.
Internationally Known
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J. I. MURRAY, PhD, Mgr.
Research Spray Drying on Dairy, Food, Chemical and Pharmaceutical Products—New Food Products Development—Milk and Ice Cream Products Development—Consultation on Food Products Advertising—Cooperation with other laboratories.
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SCHWARZ LABORATORIES, Inc.
Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvment
Research and Investigations
Legal Testimony
Write for bulletin describing facilities and services
230 Washington St., Mount Vernon, N. Y.

BRADBURY RESEARCH ASSOC., INC.
Food Plant Consultants
PLANT SANITATION—MANDATORY LABELING, LABORATORY SERVICES; Filth in foods, food analysis, bacteriological tests.
817 Moody Street Waltham 54, Mass.

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Industrial Consultants
DAVID N. LEWIN, Ph.D., FOOD CONSULTANT
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Design — Layouts — Investigations — Consultations — Reports — Market Investigations — Bakeries, Dairy Products—Food Preserving by Heat, Drying, Freezing—Consultation in Managing, Warehousing, Distribution—Formulae, New Products,
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FOSTER D. SNELL, INC.
Research Chemists and Engineers
Organoleptic Panel Testing, Formulation and Stability; Protective Packaging.
Inquiries invited on food research problems.
(Official Laboratory Association of Food Distributors, Inc.)
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Consulting Service
S. W. ARENSON, DIRECTOR
Service to the Baking and Potato Chip Industries
Baking, Frying, Chemical, Physical
Product Development Formulation Quality Control
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MID-WEST TESTING LABORATORIES
Nutritional and Biochemical Consultation
Testing and Analysis
TOXICOLOGICAL STUDIES
903 Builders Building, Chicago 1, Illinois
CEntral 6-1314

STRASBURGER & SIEGEL
Chemists—Bacteriologists—Food Technologists
Specialists in Canned and Glassed Foods
Laboratory Services
Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods, Food and Drug Labels, Expert Testimony
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Productive advertising is an INVESTMENT rather than an EXPENDITURE.

"Searchlight" advertisers almost invariably report prompt and satisfactory results.

BE CONVINCED — send us your advertisement TODAY.

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FOOD ENGINEERING
330 W. 42nd St., N. Y. 36, N. Y.

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

New Advertisements

received by February 24th will appear in the March issue subject to limitation of space available. Address copy to the

FOOD ENGINEERING
330 W. 42nd St., New York 36, N. Y.

INGREDIENTS FOR THE FOOD PROCESSOR

CARROT OIL makes food golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:

$1.20 a Line—Minimum 3 Lines.

To figure advance payment count 5 average words as a line.

POSITION WANTED undisplayed advertising rate is one-half of above rate, payable in advance.

PROPOSALS, $1.20 a line an insertion.

INFORMATION:

BOX NUMBERS count as one additional line.

DISCOUNT of 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

DISPLAYED RATE:

The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rates on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

Send NEW ADVERTISEMENTS to New York City Office, 330 W. 42nd St., New York 36, N. Y., for the March issue closing February 24th

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Ph.D. OR equivalent in experience to direct new laboratory section concerned with development of new food and feed products. Medium-sized, well-established company. Please send complete resume and photo if available. P-1598, Food Engineering.

EMPLOYMENT SERVICE

SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

CHEMICAL ENGINEER required, bilingual, experience including canning specialty meat. Work will entail management of present manufactured goods and future products. Located in Montreal. Salary will depend on experience, qualifications and so forth. Replies held confidential. PW-9873, Food Engineering.

AVAILABLE February 1st Experienced production manager in Bakers Specialties, jams, jellies, flavors et cetera. Supervision, formulation, sales. PW-1025, Food Engineering.

CHEMICAL ENGINEER, B. S., with fourteen years diversified experience in dairy by-product and fermentation industries. Experienced in plant design and process development. Desires responsible position with a future. PW-1440, Food Engineering.

INDUSTRIAL ENGINEER. 4 years experience manufacturing and transport scheduling layout, procedures, job evaluation. M.B.A. Will relocate, Age 31. PW-1489 Food Engineering.

PRODUCTION & RESEARCH Chemist, with extensive experience in production, manufacture, development, and control of confectionery, desserts, cereal products, chocolate, and other food products, desires position of responsibility. PW-1574, Food Engineering.

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3625	Munson Mill Mach. Co. Rotary Cutter; Size "0"
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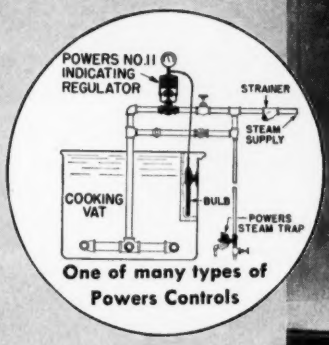

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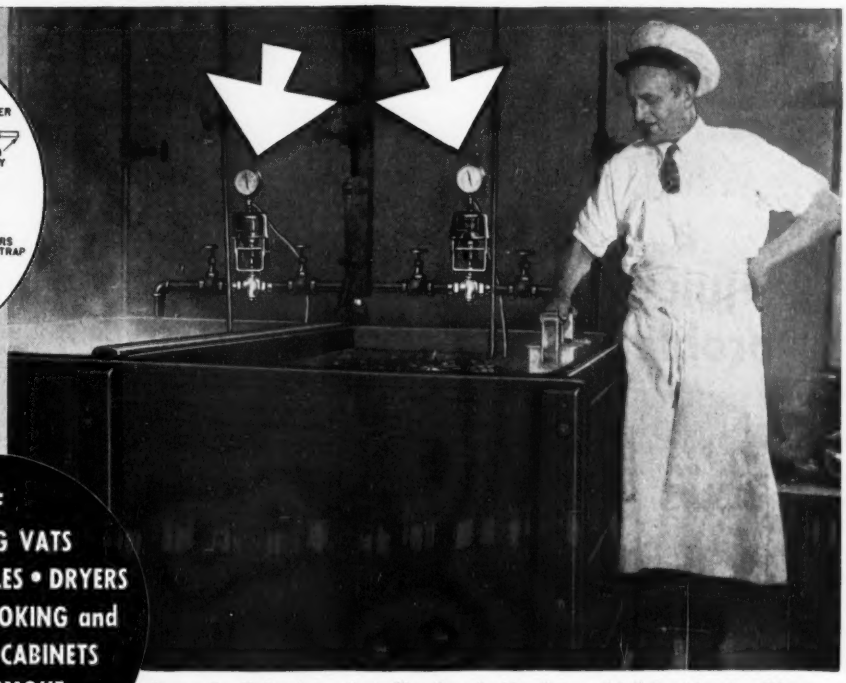

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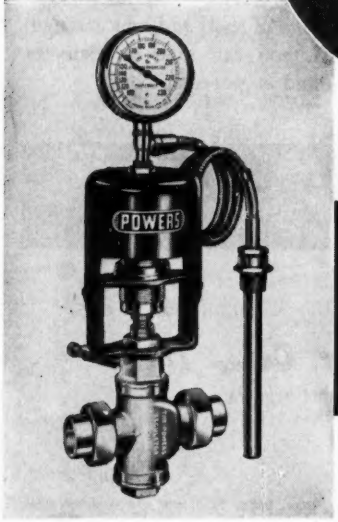

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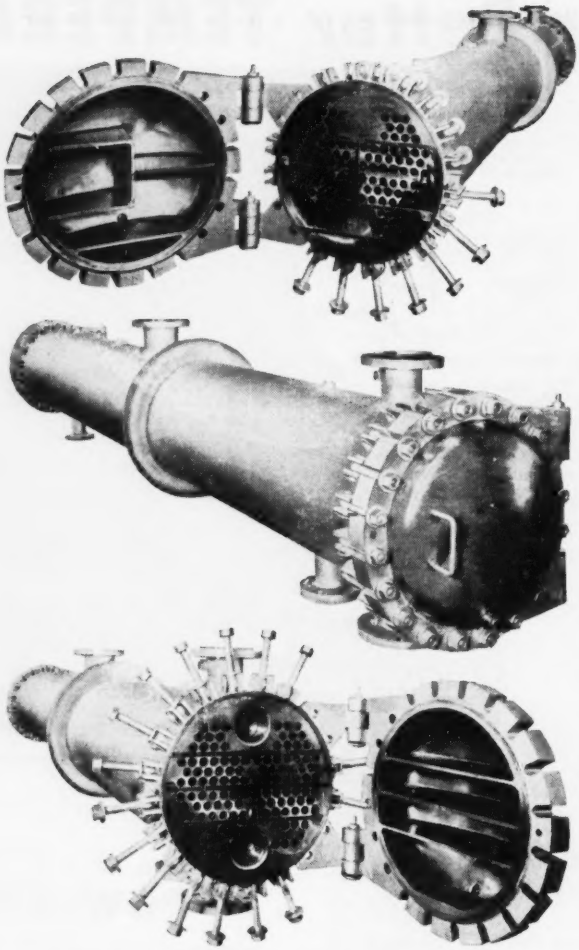

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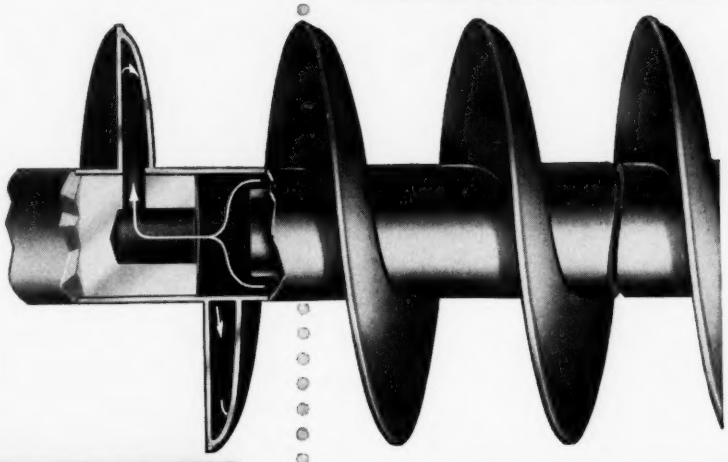

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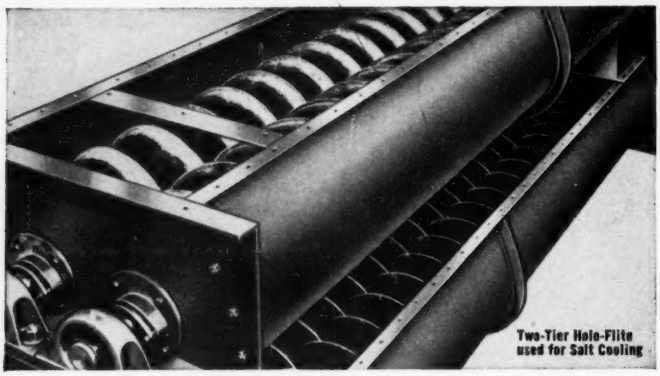

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Unique Simplicity

Basically, the HOLO-FLITE consists of two or more hollow intermeshing conveyor screws that slowly rotate in a trough or tube. The cooling agent circulates through the hollow flights and shafts of the conveyor screws while the product itself "flows" in the trough where it is constantly rotated into, around, over and under the moving heat-exchange surfaces. The continuous mixing, turning, folding action causes a constant change of contact with the heat-exchange surfaces and results in a high rate of heat transfer. Yet the action is so gentle that there is no dusting and little, if any, abrasion of crystalline particles.

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Be sure to investigate HOLO-FLITE savings before you install heat-exchange equipment. To insure maximum operating efficiency at low overall cost, each installation is individually engineered to the job using basic stock-size elements. Contact the nearest Western Precipitation office for further details on the revolutionary HOLO-FLITE Processor—or write direct!

FREE! New 8 Page Bulletin describing HOLO-FLITE features and applications will gladly be sent on request!

*Reg. T.M.

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